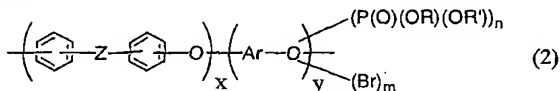
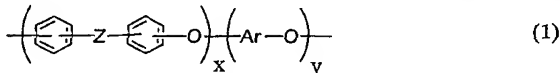


What is claimed is:

1. An aromatic polymer phosphonic acid derivative, which is represented by the formula (2),

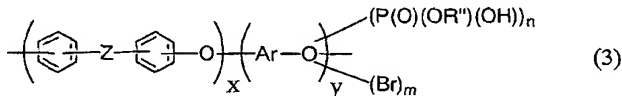


wherein -Z- represents -SO₂- or -CO-, x and y are average molar ratios in the polymer and respectively represent 0.01 to 0.99, provided that the sum of x and y is 1; -Ar- represents a divalent aromatic group having 4 to 18 carbon atoms which may contain hetero atom, and said -Ar- may have one or more substituents; R and R' each independently represent an alkyl group; m and n independently represent an average number of substituents per unit structure (-Ar-O-) of an aromatic polymer compound (1),



m is 0 to 8, n is a positive number of 8 or less, and the sum of m and n is 8 or less; or

an aromatic polymer phosphonic acid derivative whose free acid form is represented by the formula (3):

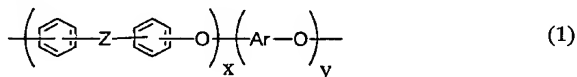


wherein -Z-, x, y, -Ar- m and n have the same meaning as above,

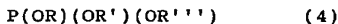
and R'' represents hydrogen or an alkyl group.

2. The phosphonic acid derivative according to claim 1, wherein -Ar- is a phenylene group which may have one or more substituents or a biphenyldiyl group which may have one or more substituents.

3. A process for producing an aromatic polymer phosphonic acid derivative represented by the above formula (2), wherein the process comprises brominating an aromatic polymer compound represented by the formula (1):



wherein -Z-, x, y and -Ar- have the same meaning as above, with a brominating agent, and acting thereon a trialkyl phosphite represented by the formula (4):



wherein R, R' and R'' each independently represent an alkyl group, in the presence of a nickel halide catalyst in an organic solvent.

4. A process for producing an aromatic polymer phosphonic acid derivative of the free acid form represented by the above formula (3), wherein the process comprises brominating an aromatic polymer compound represented by the formula (1) with a brominating agent, and acting thereon a trialkyl phosphite represented by the above formula (4) in the presence of a nickel

10062435-020502

halide catalyst in an organic solvent to give an aromatic polymer phosphonic acid derivative represented by the above formula (2), and then hydrolyzing said acid derivative.

5. The process according to claim 3 or 4, wherein nickel chloride (II) is used as the nickel halide.

6. The process according to claim 3 or 4, wherein an amide compound is used as the organic solvent.

7. The process according to claim 3 or 4, wherein at least one compound selected from trimethyl phosphite and triethyl phosphite is used as the trialkyl phosphite.

8. A process for producing an aromatic polymer phosphonic acid derivative of the free acid form represented by the above formula (3), wherein the process comprises hydrolyzing the aromatic polymer phosphonic acid derivative represented by the above formula (2).

9. The process according to claim 4 or 8, wherein the hydrolysis is carried out in the presence of an alkali.

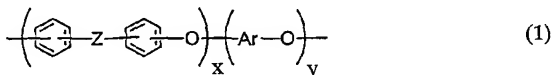
10. The process according to claim 4 or 8, wherein the hydrolysis is carried out in the presence of an acid.

11. The process according to claim 4 or 8, wherein the hydrolysis is carried out after acting a trialkyl silyl halide on the phosphonic acid di-ester.

12. The process according to claim 3 or 4, wherein -Ar- is a phenylene group which may have one or more substituents or

a biphenyldiyl group which may have one or more substituents.

13. A process for brominating an aromatic polymer compound represented by the formula (1) with *N*-bromosuccinimide in the presence of a strong acid in an organic solvent,



wherein -Z- represents -SO₂- or -CO-, x and y respectively represent 0.01 to 0.99, provided that the sum of x and y is 1; -Ar- represents a divalent aromatic group having 4 to 18 carbon atoms which may contain hetero atom, and said -Ar- may have one or more substituents.

14. The process according to claim 13, wherein -Ar- is a phenylene group which may have one or more substituents or a biphenyldiyl group which may have one or more substituents.

15. The process according to claim 13 or 14, wherein the strong acid is sulfuric acid.

16. The process according to claim 13 or 14, wherein the organic solvent contains at least one selected from halogenated methanes and halogenated ethanes.

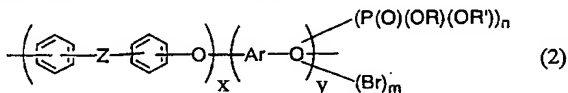
17. A polymer electrolyte comprising, as an active ingredient, an aromatic polymer phosphonic acid derivative represented by the above formula (2) and/or an aromatic polymer phosphonic acid derivative of the free acid form represented by the above formula (3).

18. A polymer electrolyte membrane in which the polymer electrolyte according to claim 17 is used.

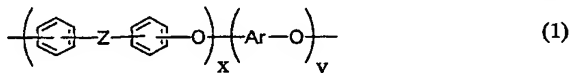
10062435.020502

What is claimed is:

1. An aromatic polymer phosphonic acid derivative, which is represented by the formula (2),

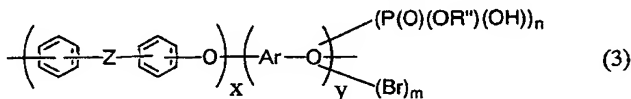


wherein -Z- represents -SO₂- or -CO-, x and y are average molar ratios in the polymer and respectively represent 0.01 to 0.99, provided that the sum of x and y is 1; -Ar- represents a divalent aromatic group having 4 to 18 carbon atoms which may contain hetero atom, and said -Ar- may have one or more substituents; R and R' each independently represent an alkyl group; m and n independently represent an average number of substituents per unit structure (-Ar-O-) of an aromatic polymer compound (1).



m is 0 to 8, n is a positive number of 8 or less, and the sum of m and n is 8 or less; or

an aromatic polymer phosphonic acid derivative whose free acid form is represented by the formula (3):

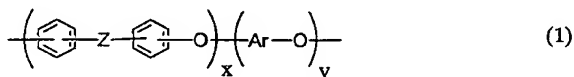


wherein -Z-, x, y, -Ar- m and n have the same meaning as above,

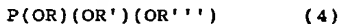
and R' represents hydrogen or an alkyl group.

2. The phosphonic acid derivative according to claim 1, wherein -Ar- is a phenylene group which may have one or more substituents or a biphenyldiyl group which may have one or more substituents.

3. A process for producing an aromatic polymer phosphonic acid derivative represented by the above formula (2), wherein the process comprises brominating an aromatic polymer compound represented by the formula (1):



wherein -Z-, x, y and -Ar- have the same meaning as above, with a brominating agent, and acting thereon a trialkyl phosphite represented by the formula (4):



wherein R, R' and R'' each independently represent an alkyl group, in the presence of a nickel halide catalyst in an organic solvent.

4. A process for producing an aromatic polymer phosphonic acid derivative of the free acid form represented by the above formula (3), wherein the process comprises brominating an aromatic polymer compound represented by the formula (1) with a brominating agent, and acting thereon a trialkyl phosphite represented by the above formula (4) in the presence of a nickel

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=> display history full l1-

FILE 'HCAPLUS' ENTERED AT 18:21:17 ON 29 OCT 2003
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 L2 1660 SEA YASHIRO ?/AU OR ARITHIRO ?/AU
 L3 5476 SEA HIDAKA ?/AU OR YASUAKI ?/AU
 L4 2 SEA L1 AND L2 AND L3
 SEL L4 1-2 RN

FILE 'REGISTRY' ENTERED AT 18:28:16 ON 29 OCT 2003
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 L6 3 SEA L5 AND PMS/CI
 L7 0 SEA L5 AND BR/ELS
 L8 2 SEA L5 AND P/ELS

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 L11 62922 SEA BROMINAT?
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 L16 STR

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 SAV L19 TRU435/A

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 L24 0 SEA L22 AND L23
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L25 1 SEA N-BROMOSUCCINIMIDE/CN
E BROMINE/CN
L26 1 SEA BROMINE/CN
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L29 1 SEA L28 AND L8
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OR BR2 OR BROMINAT?
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L42 3 SEA L41 AND L38
L43 21110 SEA POLYSULFONE#
L44 73781 SEA POLYETHER#
L45 10167 SEA L43 AND L44
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TRANSFER?)
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OR CELLS OR HYDROGEN# OR H2 OR H)
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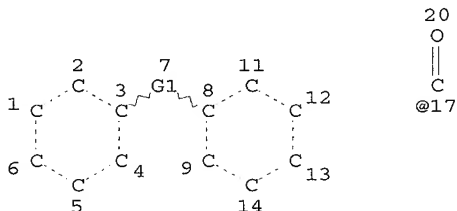
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DEFAULT ECLEVEL IS LIMITED

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NUMBER OF NODES IS 5

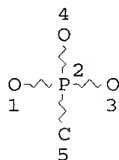
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L16 STR



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 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

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 NUMBER OF NODES IS 5

STEREO ATTRIBUTES: NONE

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100.0% PROCESSED 39 ITERATIONS

SEARCH TIME: 00.00.01

39 ANSWERS

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=> d l61 1-8 cbib abs hitstr hitind

L61 ANSWER 1 OF 8 HCAPLUS COPYRIGHT 2003 ACS on STN

2003:554038 Document No. 139:119905 Proton-conducting sulfonated

polysulfone-polyethers and polyketone-

polyethers as fuel cell separators. Sasaki,

Shigeru; Yashiro, Arihiro; Hidaka, Yasuaki; Taniguchi, Yakumi

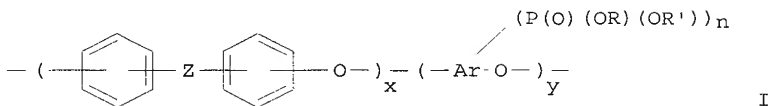
(Sumitomo Chemical Company Limited, Japan). Fr. Demande FR 2834716

A1 20030718, 36 pp. (French). CODEN: FRXXBL. APPLICATION: FR

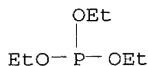
2003-385 20030115. PRIORITY: JP 2002-5797 20020115; JP 2002-5796

20020115.

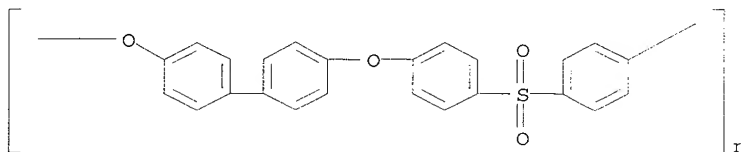
GI



- AB Proton-conducting polymer membranes, esp. for fuel cells, are phosphonic acid-contg. polyether-polyketones or polyether-polysulfones, of general structure I, in which Z = -SO₂- or -C(:O)-; x and y = 0.01-0.99 (x + y = 1); -Ar- is a C₄-18-arylene and can contain heteroatoms; n .ltoreq.8; and R and R' = H or alkyl, in addn. to at least one other component selected from phosphoric acid (or deriv.) and a polymer electrolyte. The polymer has a proton cond. of .gtoreq.1 .times. 10⁻⁴ S/cm. The phosphoric acid deriv. has the general formula O:P(OR₂)_k(OH)_{3-k}, in which R₂ = C₁-6-alkyl or an aryl group, and; k = 0-2. The phosphonic acid groups are grafted onto the polymer by bromination with N-bromosuccinimide, followed by reaction with tri-Et phosphite in the presence of NiCl₂.
- IT 122-52-1DP, Triethyl phosphite, reaction products with sulfonated brominated polysulfone-polyethers 25839-81-ODP, Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene), sulfonated, brominated, reaction products with tri-Et phosphite 83094-08-ODP, sulfonated (membranes; proton-conducting sulfonated polysulfone-polyethers and polyketone-polyethers as fuel cell separators)
- RN 122-52-1 HCAPLUS
- CN Phosphorous acid, triethyl ester (8CI, 9CI) (CA INDEX NAME)



- RN 25839-81-0 HCAPLUS
- CN Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)

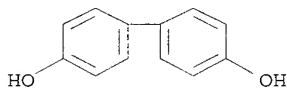


RN 83094-08-0 HCAPLUS
 CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 92-88-6

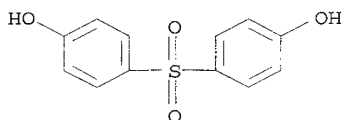
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CM 2

CRN 80-09-1

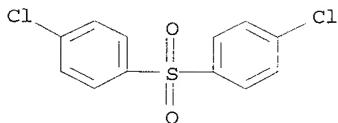
CMF C12 H10 O4 S



CM 3

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



IT 13598-36-2DP, Phosphonic acid, aryl and polymeric
 derivs. 174899-22-0DP, sulfonated
 (membranes; proton-conducting sulfonated polysulfone-
 polyethers and polyketone-polyethers as fuel
 cell separators)
 RN 13598-36-2 HCAPLUS
 CN Phosphonic acid (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

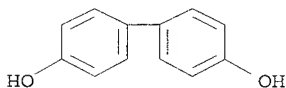


*** FRAGMENT DIAGRAM IS INCOMPLETE ***

RN 174899-22-0 HCAPLUS
 CN [1,1'-Biphenyl]-4,4'-diol, polymer with 4,4'-sulfonylbis[phenol]
 (9CI) (CA INDEX NAME)

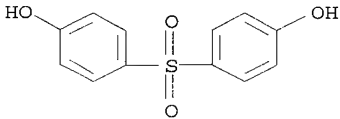
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CRN 92-88-6
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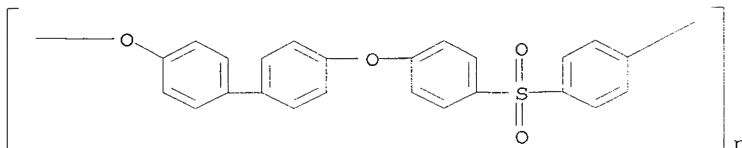
CM 2

CRN 80-09-1
 CMF C12 H10 O4 S



- IC ICM C08L071-12
ICS C08K005-521; C08J005-22; H01M008-10
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
- ST fuel cell proton conducting membrane **polysulfone**
polyether; sulfonated **polysulfone**
polyether fuel cell membrane; polyketone **polyether**
fuel cell proton conducting membrane
- IT Polyketones
Polysulfones, uses
(polyether-, arom., sulfonated, **phosphonic**
acid-contg.; proton-conducting sulfonated **polysulfone-**
polyethers and polyketone-**polyethers** as fuel
cell separators)
- IT Polysulfones, uses
(polyether-polyoxyphenylene-, arom., block, sulfonated,
phosphonic acid-contg.; proton-conducting sulfonated
polysulfone-polyethers and polyketone-
polyethers as fuel cell separators)
- IT Polyoxyphenylenes
(polyether-**polysulfone-**, arom., block,
sulfonated, **phosphonic** acid-contg.; proton-conducting
sulfonated **polysulfone-polyethers** and
polyketone-**polyethers** as fuel cell separators
)
- IT Polyethers, uses
(polyketone-, arom., sulfonated, **phosphonic**
acid-contg.; proton-conducting sulfonated **polysulfone-**
polyethers and polyketone-**polyethers** as fuel
cell separators)
- IT Polyethers, uses
(polyoxyphenylene-**polysulfone-**, arom., block,
sulfonated, **phosphonic** acid-contg.; proton-conducting
sulfonated **polysulfone-polyethers** and
polyketone-**polyethers** as fuel cell separators
)
- IT Polyethers, uses
(**polysulfone-**, arom., sulfonated, **phosphonic**
acid-contg.; proton-conducting sulfonated **polysulfone-**
polyethers and polyketone-**polyethers** as fuel
cell separators)
- IT Fluoropolymers, uses
(porous substrates; proton-conducting sulfonated

- polysulfone-polyethers and polyketone-polyethers as fuel cell separators)
- IT Fuel cell separators
(proton-conducting sulfonated polysulfone-polyethers and polyketone-polyethers as fuel cell separators)
- IT Ionic conductivity
(proton; proton-conducting sulfonated polysulfone-polyethers and polyketone-polyethers as fuel cell separators)
- IT 122-52-1DP, Triethyl phosphite, reaction products with sulfonated brominated polysulfone-polyethers 25839-81-ODP, Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene), sulfonated, brominated, reaction products with tri-Et phosphite 83094-08-ODP, sulfonated 83094-08-ODP, sulfonated, brominated, reaction products with tri-Et phosphite (membranes; proton-conducting sulfonated polysulfone-polyethers and polyketone-polyethers as fuel cell separators)
- IT 13598-36-2DP, Phosphonic acid, aryl and polymeric derivs. 174899-22-ODP, sulfonated (membranes; proton-conducting sulfonated polysulfone-polyethers and polyketone-polyethers as fuel cell separators)
- L61 ANSWER 2 OF 8 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:352062 Document No. 138:354944 Proton-conductive membrane for electrochemical applications. Jakoby, Kai; Nunes, Suzana Pereira; Peinemann, Klaus-Victor (GKSS-Forschungszentrum Geesthacht G.m.b.H., Germany). Ger. Offen. DE 10148131 A1 20030508, 4 pp. (German). CODEN: GWXXBX. APPLICATION: DE 2001-10148131 20010928.
- AB A proton-conductive membranes for electrochem. applications, in particular for fuel cells, are manufd. by attaching phosphonic acid groups to arom. rings of nonvinyl polymers such as polysulfones without spacer groups between the rings and the phosphonic acid groups. Optionally, the polymers also have sulfonic acid groups directly bonded to the arom. rings.
- IT 25839-81-ODP, phosphonic acid derivs.
(proton-conductive membranes based on phosphonic acid derivs. of polysulfones for electrochem. applications)
- RN 25839-81-0 HCAPLUS
CN Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



- IC ICM C08J005-22
ICS C08G075-20; B01D071-82; H01M008-02
- CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52
- ST polysulfone **phosphonated** proton conductive membrane fuel cell; sulfonated **phosphonated** polymer proton conductive membrane fuel cell
- IT Polysulfones, uses
(**phosphonic** acid derivs.; proton-conductive membranes based on **phosphonic** acid derivs. of polysulfones for electrochem. applications)
- IT Polysulfones, uses
(polyether-, **phosphonic** acid derivs.; proton-conductive membranes based on **phosphonic** acid derivs. of polysulfones for electrochem. applications)
- IT Polyethers, uses
(polysulfone-, **phosphonic** acid derivs.; proton-conductive membranes based on **phosphonic** acid derivs. of polysulfones for electrochem. applications)
- IT Fuel cells
Ionic conductors
Membranes, nonbiological
(proton-conductive membranes based on **phosphonic** acid derivs. of polysulfones for electrochem. applications)
- IT 25839-81-0DP, **phosphonic** acid derivs.
(proton-conductive membranes based on **phosphonic** acid derivs. of polysulfones for electrochem. applications)

L61 ANSWER 3 OF 8 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:282877 Document No. 138:306811 Oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**. Lehmann, Dieter; Meier-Haack, Jochen; Vogel, Claus; Taeger, Antje; Pereira Nunes, Suzana; Paul, Dieter; Peinemann, Klaus-viktor; Jakoby, Kai (Institut Fuer Polymerforschung Dresden E.V., Germany; Gkss-Forschungszentrum Geesthacht GmbH). PCT Int. Appl. WO 2003030289 A2 20030410, 30 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF,

BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (German). CODEN: PIXXD2. APPLICATION: WO 2002-DE3736 20020927. PRIORITY: DE 2001-10149716 20010928.

- AB Fuel cell polymer membranes, esp. with improved methanol retention capacity for direct methanol fuel cells, comprises one or more sepg. layers consisting of diblock or multiblock copolymers, with general segment structures A-(B-A)_k, B-(A-B)_l, and (A-B)_m (k .gtoreq.1, l .gtoreq.1, and m .gtoreq.1), in which the block segment (A) comprises an oligomer segment that is non-conducting to electrons and non-conducting to protons, and the block segment (B) comprises an oligomer segment that is conducting to protons and non-conducting to electrons. Block segments (A) and (B) are selected from oligoarylimide, oligoaryl sulfide, oligoaryl ether sulfone, oligoaryl ether, oligoaryl ether ketone, oligoarylene ether ether ketone, oligoaramide, oligoaryl urea, oligoarylene oxadiazole, oligoarylene sulfonamide, oligobenzimidazole, oligobenzoxazole, oligobenzthiazole, and oligoquinoline segments, with d.p. 2-50, optionally in combination with proton-conducting groups, such as sulfonic acids, **phosphonic acids**, (perfluoro)alkylsulfonic acids, (perfluoro)alkyl**phosphonic acids**, (perfluoro)alkenecarboxylic acids, triazine groups, tertiary-amino groups, and quaternary ammonium groups.
- IC ICM H01M008-10
ICS C08J005-22; B01D071-80
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
- IT Perfluoro compounds
(alkanesulfonic acids, arom. block polyimides contg.; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)
- IT Sulfonic acids, uses
(alkanesulfonic, perfluoro, arom. block polyimides contg.; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)
- IT Sulfonic acids, uses
(arom. block polyimides contg.; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)
- IT Polyimides, uses
(arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)
- IT Perfluoro compounds
(carboxylic acids, arom. block polyimides contg.; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)
- IT Polyimides, uses
(epoxy, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer **separators**)
- IT Conducting polymers

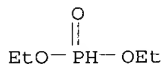
Fuel cell separators

(oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)

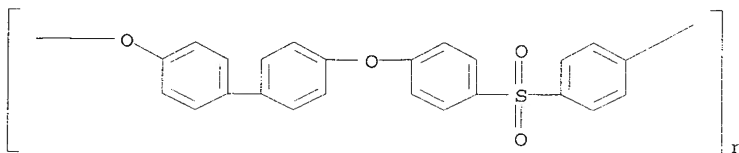
- IT Carboxylic acids, uses
(perfluoro, arom. block polyimides contg.; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Polyimides, uses
(polyamide-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Polyimides, uses
(polybenzimidazole-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Polyimides, uses
(polybenzoxazole-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Polyimides, uses
(polyether-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Polyketones
Polysulfones, uses
(polyether-polyimide-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Polyimides, uses
(polyether-polyketone-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Polyimides, uses
(polyether-polysulfone-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Epoxy resins, uses
Polyamides, uses
Polybenzimidazoles
Polybenzoxazoles
Polyethers, uses
Polyketones
Polysulfides
Polysulfonamides
Polyureas
(polyimide-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Polyoxadiazoles
Polyquinolines
(polyimide-, block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)

- separators)
- IT Polyethers, uses
(polyimide-polyketone-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Polyethers, uses
(polyimide-polysulfone-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Polyimides, uses
(polyketone-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Polyimides, uses
(polyoxadiazole-, block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Polyimides, uses
(polyquinoline-, block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Polyimides, uses
(polysulfide-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Polyimides, uses
(polysulfonamide-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Polyimides, uses
(polyurea-, arom., block; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Polythiophenylenes
(substrate; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT Functional groups
(triazino- and quaternary ammonio-, arom. block polyimides contg.; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT 507471-35-4P 507471-36-5P 507471-37-6P 507471-38-7P
507471-39-8P 507488-67-7P 507488-68-8P
(fuel cell separator; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- IT 9046-51-9P 25135-51-7P 32169-85-0P 63943-11-3P 87092-09-9P
507471-30-9P 507471-31-0P 507471-33-2P 507471-34-3P
507471-40-1P 508186-74-1P 508189-27-3P 508189-33-1P
(prepn. and block polymn. of; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell

- polymer separators)
 IT 13598-36-2DP, **Phosphonic acid**, polymers with arom. block polyimides
 (separators; oligomeric proton-conducting polyimide and acid-functionalized block copolymers as fuel cell polymer separators)
- L61 ANSWER 4 OF 8 HCAPLUS COPYRIGHT 2003 ACS on STN
 2003:230866 Document No. 139:22602 Palladium-catalyzed **phosphonation** of polyphenylsulfone. Jakoby, Kai; Peinemann, K. V.; Nunes, Suzana P. (GKSS Research Center, Institute of Chemistry, Geesthacht, D-21502, Germany). Macromolecular Chemistry and Physics, 204(1), 61-67 (English) 2003. CODEN: MCHPES. ISSN: 1022-1352. Publisher: Wiley-VCH Verlag GmbH & Co. KGaA.
- AB An efficient synthetic procedure for the **phosphonation** of arom. polymers was developed and is here exemplified for Radel R-5000 [poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene)]. This procedure involved the **bromination** of the polymer and the subsequent **bromine-phosphorus** exchange by means of a Pd(0)-catalyzed P-C coupling reaction. In the resulting product, the **phosphonate** ester pendant groups were attached to arom. rings of the polymer chain without alkylene spacer units. A substitution degree of almost one **phosphonate** moiety per repeating unit of the polymer was achieved in the presence of Pd2(dba)3.cntdot.CHCl3 as catalyst at 120.degree.C. Polymers with free **phosphonic acid** groups were prepd. by ester hydrolysis.
- IT 762-04-9DP, Diethyl **phosphite**, reaction products with biphenyl-contg. **polyether polysulfones**
 (palladium-catalyzed **phosphonation** of biphenyl-contg. **polyether polysulfones**)
- RN 762-04-9 HCAPLUS
 CN **Phosphonic acid**, diethyl ester (8CI, 9CI) (CA INDEX NAME)



- IT 25839-81-0DP, Radel R-5000, **phosphonic acid** derivs.
 (palladium-catalyzed **phosphonation** of biphenyl-contg. **polyether polysulfones**)
- RN 25839-81-0 HCAPLUS
 CN Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



- CC 35-8 (Chemistry of Synthetic High Polymers)
ST biphenyl polyether polysulfone
phosphonation palladium catalyzed
IT Phosphonylation catalysts
(palladium-catalyzed phosphonation of biphenyl-contg.
polyether polysulfones)
IT Polysulfones, preparation
(polyether-, arom., phosphonated;
palladium-catalyzed phosphonation of biphenyl-contg.
polyether polysulfones)
IT Polyethers, preparation
(polysulfone-, arom., phosphonated;
palladium-catalyzed phosphonation of biphenyl-contg.
polyether polysulfones)
IT 14221-01-3, Tetrakis(triphenylphosphine)palladium 52522-40-4,
Tris(dibenzylideneacetone)dipalladium-chloroform adduct
(palladium-catalyzed phosphonation of biphenyl-contg.
polyether polysulfones)
IT 762-04-9DP, Diethyl phosphite, reaction products
with biphenyl-contg. polyether polysulfones
(palladium-catalyzed phosphonation of biphenyl-contg.
polyether polysulfones)
IT 25839-81-ODP, Radel R-5000, phosphonic acid
derivs.
(palladium-catalyzed phosphonation of biphenyl-contg.
polyether polysulfones)
- L61 ANSWER 5 OF 8 HCAPLUS COPYRIGHT 2003 ACS on STN
2002:734081 Document No. 137:250314 Mesoporous network electrode for
electrochemical cell. Sugnaux, Francois; Pappas, Nicholas;
Graetzel, Michael (Switz.). Eur. Pat. Appl. EP 1244168 A1 20020925,
22 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR,
IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR.
(English). CODEN: EPXXDW. APPLICATION: EP 2001-810286 20010320.
AB A high kinetics rate electrochem. cell in which at least one of the
electrodes is composed of a mesostructural electroactive material is
comprising a three-dimensional framework structure of mesoporous
texture forming a bi-continuous junction of large sp. surface area
with the electrolyte. The electrode material, which is suited for
reversible ion intercalation and for electronic transport, is
penetrated by an interconnected porous space filled with electrolyte
the latter serving for ionic transport. The three dimensional

framework structure of the electrode is designed in a manner to overcome impediment of ionic diffusion in the electrolyte encountered with conventional high surface area electrodes and to provide interconnectivity, mech. stability of the solid phase as well as access of the electrolyte to the entire pore space. A low temp. method of prepn. of the electrodes employs a high-speed deposition of the elec. active material in the form of a thin film. The application of the electrodes in high power lithium ion insertion batteries, photovoltaic cells, supercapacitors and fast electrochromic devices is disclosed.

- IC ICM H01M010-40
- ICS H01M004-36; H01G009-20; H01G009-00; G02F001-15
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- Section cross-reference(s): 38, 74, 76
- IT Polysulfones, uses
 - (polyether-, acryloylated, binder; mesoporous network electrode for electrochem. cell)
- IT Polyimides, uses
 - Polysulfones, uses
 - (polyether-, binder; mesoporous network electrode for electrochem. cell)
- IT Polysulfones, uses
 - (polyether-, chloromethylated, binder; mesoporous network electrode for electrochem. cell)
- IT Polyethers, uses
 - (polysulfone-, acryloylated, binder; mesoporous network electrode for electrochem. cell)
- IT Polyethers, uses
 - (polysulfone-, binder; mesoporous network electrode for electrochem. cell)
- IT Polyethers, uses
 - (polysulfone-, chloromethylated, binder; mesoporous network electrode for electrochem. cell)
- IT 92-84-2D, Phenothiazine, **phosphonated** 7440-44-0, Carbon, uses 7782-42-5, Graphite, uses 9003-29-6, Polybutylene (mesoporous network electrode for electrochem. cell)
- IT 1314-23-4, Zirconia, uses 1314-61-0, Tantala 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 7631-86-9D, Silica, silanized (**separator**; mesoporous network electrode for electrochem. cell)

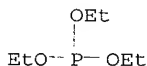
L61 ANSWER 6 OF 8 HCAPLUS COPYRIGHT 2003 ACS on STN
 2002:693172 Document No. 137:201741 Aromatic **polyether** containing **phosphonate** groups and a process for the manufacture thereof. Sasaki, Shigeru; Yashiro, Arihiro; Hidaka, Yasuaki (Sumitomo Chemical Company, Limited, Japan). Eur. Pat. Appl. EP 1238998 A1 20020911, 15 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR. (English). CODEN: EPXXDW.
 APPLICATION: EP 2002-3124 20020213. PRIORITY: JP 2001-38116 20010215; JP 2001-125501 20010424; JP 2001-379819 20011213.
 AB Provided is an arom. polymer **phosphonic acid deriv.** in

which a **phosphonic acid deriv. group** is directly bound to an arom. ring. The arom. polymer **phosphonic acid deriv.** can be produced by **brominating** a specific arom. polymer compd. with a **brominating agent**, then acting thereon trialkyl **phosphite** in the presence of a nickel halide catalyst to give a **phosphonic acid di-ester**, and further, by hydrolyzing the di-ester. The arom. polymer **phosphonic acid deriv.** is excellent in radical resistance and used for a solid polymer type fuel cell. A polymer with repeating unit p-C₆H₄SO₂-p-C₆H₄O-p-C₆H₄-pC₆H₄O was **brominated** with N-bromosuccinimide, then treated with tri-Et phosphate. 122-52-1DP, Triethyl phosphite, reaction products with **brominated polyether-polysulfones** 25839-81-0DP, **brominated**, reaction products with tri-Et **phosphite** 83094-08-0DP, 4,4'-Biphenol-4,4'-dichlorodiphenyl sulfone-4,4'-dihydroxydiphenyl sulfone copolymer, **brominated** (arom. polyether contg. **phosphonate groups** and a process for the manuf. thereof)

IT

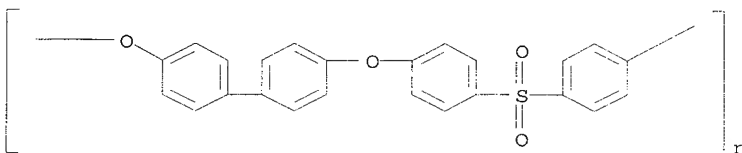
RN 122-52-1 HCAPLUS

CN Phosphorous acid, triethyl ester (8CI, 9CI) (CA INDEX NAME)



RN 25839-81-0 HCAPLUS

CN Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



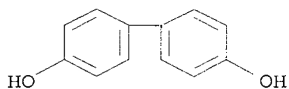
RN 83094-08-0 HCAPLUS

CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 92-88-6

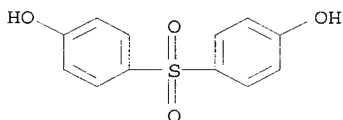
CMF C12 H10 O2



CM 2

CRN 80-09-1

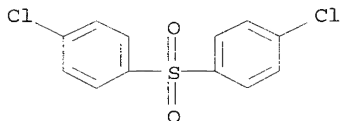
CMF C12 H10 O4 S



CM 3

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



IC ICM C08G075-23

ICS C08G065-48; B01D071-52; B01D071-68

CC 35-5 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 52

ST arom **polyether phosphonate** group electrolyte membrane

IT **Bromination**

Polymer electrolytes

(arom. **polyether** contg. **phosphonate** groups and a process for the manuf. thereof)

IT Polyoxyarylenes

(**phosphonate** group-contg.; arom. **polyether** contg. **phosphonate** groups and a process for the manuf. thereof)

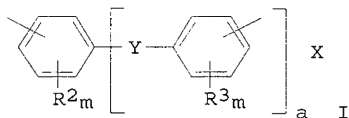
IT **Polysulfones**, preparation

(**polyether**-, **phosphonate** group-contg.; arom.

- polyether contg. phosphonate groups and a process for the manuf. thereof)
- IT Membranes, nonbiological
(polymer electrolyte; arom. polyether contg. phosphonate groups and a process for the manuf. thereof)
- IT Polyethers, preparation
(polysulfone-, phosphonate group-contg.; arom. polyether contg. phosphonate groups and a process for the manuf. thereof)
- IT 7718-54-9, Nickel (II) chloride, uses
(arom. polyether contg. phosphonate groups and a process for the manuf. thereof)
- IT 122-52-1DP, Triethyl phosphite, reaction products with brominated polyether-polysulfones
25839-81-ODP, brominated, reaction products with tri-Et phosphite 83094-08-ODP,
4,4'-Biphenol-4,4'-dichlorodiphenyl sulfone-4,4'-dihydroxydiphenyl sulfone copolymer, brominated
(arom. polyether contg. phosphonate groups and a process for the manuf. thereof)

L61 ANSWER 7 OF 8 HCAPLUS COPYRIGHT 2003 ACS on STN
1992:153107 Document No. 116:153107 Flame-resistant, nondripping poly(alkylene terephthalate) molding compositions and their use. Fuhr, Karl; Mueller, Friedemann; Ott, Karl Heinz (Bayer A.-G., Germany). Ger. Offen. DE 4007730 A1 19910912, 8 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1990-4007730 19900310.

GI



- AB The title compns. (100 parts) contain, in addn. to poly(alkylene terephthalate), E1(P(O)(R1)OXO)nE2 polyphosphonate (R1 = alkyl or aryl; E1 = OH, aryloxy, OXOH; E2 = H or phosphonate; R2, R3 in X = alkyl or alkoxy; Y = alkylene; a = 0 or 1; m = 0-4) 5-30, antidrip agent 0.2-2, and arom. thermoplastic with Vicat B temp. .gtoreq.180.degree. 1-30 parts. These compns. have a V-O rating in the UL 94 test with minimal P content. Thus, a compn. of poly(ethylene terephthalate) (I) 56.3, bisphenol F-methylphosphonic acid copolymer (II) 5.0, polythiophenylene 10.0, PTFE 0.4, glass fibers 20.0, wax 0.3, BaSO3 2.0, and tetrabromobisphenol A polycarbonate 6.0 parts had a V-O rating and P content 0.6% and was nondripping. A compn. of I 62.3, II 15.0, PTFE 0.4, glass fibers 20.0, wax 0.3, and BaSO4 2.0 parts also had this

rating but contained 1.8% P.
 IC ICM C08L067-02
 ICS C08K005-5333; C08L085-02; C08L027-12
 ICA C08L081-06; C08L081-02; C08L071-10; C08L071-12; C08L065-00
 CC 37-6 (Plastics Manufacture and Processing)
 IT Polycarbonates, uses
 Polyesters, uses
 Polyketones
 Polyoxyphenylenes
 Polysulfones, uses
 Polythiophenylenes
 (flame-resistant nondripping molding compns. contg.)
 IT Polycarbonates, uses
 (bromine-contg., oligomeric, flame-resistant
 nondripping molding compns. contg.)
 IT Polyesters, uses
 (phosphonate group-contg., flame-resistant nondripping
 molding compns. contg.)
 IT Polyketones
 (polyether-, flame-resistant nondripping molding
 compns. contg.)
 IT Polysulfones, uses
 (polyether-, arom., flame-resistant nondripping molding
 compns. contg.)
 IT Polyethers, uses
 (polyketone-, flame-resistant nondripping molding compns. contg.)
 IT Polyethers, uses
 (polysulfone-, arom., flame-resistant nondripping
 molding compns. contg.)

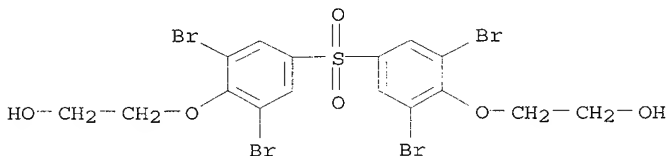
L61 ANSWER 8 OF 8 HCAPLUS COPYRIGHT 2003 ACS on STN
 1977:552880 Document No. 87:152880 Bromine-containing
 phosphonate copolymers. Okamoto, Kazuo; Yamanaka, Keio
 (Kanebo, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 52068293 19770606
 Showa, 9 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP
 1975-144156 19751202.
 AB Arom. dihydroxy compds., Br-contg. dihydroxy compds., and
 phosphonic dichloride derivs. are polymd. to give copolymers
 contg. 2-8:1 wt. ratios of Br and P which are useful as fireproofing
 agents for polyesters or polyamides. Thus, a mixt. of hydroquinone
 77, phenylphosphonic dichloride 197, and ZnCl₂ 0.3 part
 was heated 2 h at 180.degree., 2 h at 200.degree., and 1 h at
 230.degree., cooled to 160.degree., 189 parts 2,2-bis[3,5-dibromo-4-
 (2-hydroxyethoxy)phenyl]propane, heated 2 h at 160.degree., and
 evacuated 1 h at 160.degree. and 5 mm to give a copolymer (I)
 [64155-95-9] having mol. wt. 8570, m.p. 118.degree., and initial
 decompn. temp. 316.degree.. A blend of 100 parts poly(ethylene
 terephthalate) (II) [25038-59-9] and 10 parts I had O index 31.0,
 compared with 23.6 for II alone.
 IT 64155-92-6 64155-93-7
 (fireproofing agents, for polymers, manuf. of)
 RN 64155-92-6 HCAPLUS

CN Phosphonic dichloride, phenyl-, polymer with 1,3-benzenediol and
2,2'-[sulfonylbis[(2,6-dibromo-4,1-phenylene)oxy]]bis[ethanol] (9CI)
(CA INDEX NAME)

CM 1

CRN 53714-39-9

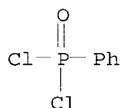
CMF C16 H14 Br4 O6 S



CM 2

CRN 824-72-6

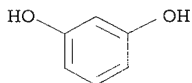
CMF C6 H5 Cl2 O P



CM 3

CRN 108-46-3

CMF C6 H6 O2



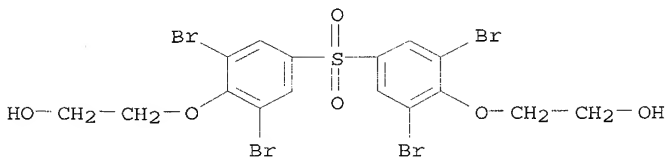
RN 64155-93-7 HCAPLUS

CN Phosphonic dichloride, propyl-, polymer with 1,4-benzenediol and
2,2'-[sulfonylbis[(2,6-dibromo-4,1-phenylene)oxy]]bis[ethanol] (9CI)
(CA INDEX NAME)

CM 1

CRN 53714-39-9

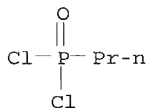
CMF C16 H14 Br4 O6 S



CM 2

CRN 4708-04-7

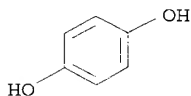
CMF C3 H7 Cl2 O P



CM 3

CRN 123-31-9

CMF C6 H6 O2



IC C08G079-04

CC 36-3 (Plastics Manufacture and Processing)

ST **polyphosphonate** brominated fireproofing agent; polyester fireproofing agent; polyamide fireproofing agent

IT Polyamides, uses and miscellaneous
(fireproofing agents for, **polyphosphonate** as)

IT Fireproofing agents
(**polyphosphonates**, for polyesters or polyamides)

IT 24937-16-4 25038-59-9, uses and miscellaneous
(fireproofing agents for, polyphosphonate as)
IT 64155-88-0 64155-89-1 64155-90-4 64155-91-5 64155-92-6
64155-93-7 64155-94-8 64155-95-9
(fireproofing agents, for polymers, manuf. of)

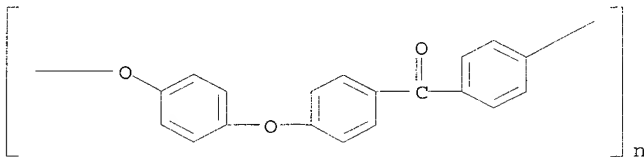
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L63 ANSWER 1 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN

2003:797076 Ion exchange composite material based on proton conductive silica particles dispersed in a polymer matrix. St.-Arnaud, Marc; Bebin, Philippe (Sim Composites Inc., Can.). PCT Int. Appl. WO 2003083985 A2 20031009, 18 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2003-CA435 20030326. PRIORITY: US 2002-PV367771 20020328.

AB The composite material comprises acid functionalized silica dispersed in a polymer matrix that is based on poly(arom. ether ketones), or poly(benzoyl phenylene), or derivs. thereof. The composite material is characterized by good water retention capabilities due to the acidic functions and the hydrophilicity of the silica particles. Moreover, a good impermeability to gas and liq. fuels commonly used in fuel cell technol., like hydrogen gas or methanol soln., is also obtained due to the presence of silica particles. Good mech. properties of the composite material let the material to be formed easily in thin film or membrane form. In that form, the composite material is usable for proton exchange membrane for fuel cells, for drying or humidifying membrane for gas or solvent conditioning, or as acid catalytic membrane.

IT 31694-16-3D, Peek, sulfonated
(ion exchange composite material based on proton conductive silica particles dispersed in polymer matrix)
RN 31694-16-3 HCAPLUS
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (9CI)
(CA INDEX NAME)



- IC ICM H01M008-10
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38, 72
 IT 7631-86-9D, Silica, acid functionalized 31694-16-3D, Peek,
 sulfonated 150385-13-0, Poly(benzoyl-1,4-phenylene)
 (ion exchange composite material based on proton conductive
 silica particles dispersed in polymer matrix)
 IT 13598-36-2, **Phosphonic acid**
 (silica particles functionalized with; ion exchange composite
 material based on proton conductive silica particles dispersed in
 polymer matrix)

L63 ANSWER 2 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
 2003:778142 An innovative method for the preparation of **proton
 conducting nanopolymeric membranes** for use in
fuel cells or in catalytic **membrane**
 reactors. Alberti, Giulio; Casciola, Mario; Pica, Monica (Fuma-Tech
 G.m.b.H., Germany). PCT Int. Appl. WO 2003081691 A2 20031002, 31
 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG,
 BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES,
 FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR,
 KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI,
 NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN,
 TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG,
 KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE,
 DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE,
 SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO
 2003-EP2904 20030320. PRIORITY: IT 2002-PG15 20020322.

AB The invention is based on the prepn. of an org. soln. of preferably
phosphonic acids and tetravalent metals salts, preferably of
 Zr, Ti, Sn and Ce, in org. solvents, which behaves as a soln. of
 layered tetravalent metals salts, preferably phosphate-
phosphonates, which are completely insol. in the known
 solvents. This peculiarity allows an easy insertion of particles of
 the above compds. in the pores of porous **membranes**, in the
 matrixes of those polymers, which are sol. in the same org.
 solvents, as well as in the **membrane/electrode interfaces**
 of **fuel cells**. The use of tetravalent metals
 salts, preferably zirconium phosphate-**phosphonates**,
 possessing high **proton cond.** (in some cases
 higher than 10⁻¹ S cm⁻¹) allows the prepn. of impregnated porous

membranes and of nano-polymeric membranes combining good mech. properties, and/or reduced permeability to gaseous species, with good proton cond. These membranes can therefore be employed in fuel cells even at temps. higher than 80.degree.. These membranes also possess a high catalytic activity and can therefore be employed in catalytic membrane reactors.

IC ICM H01M

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38, 47

ST fuel cell use conducting nanopolymeric membrane prepn; catalytic membrane reactor use conducting nanopolymeric membrane prepn; zirconium phosphate phosphonate conducting nanopolymeric membrane

IT Pore

(dimension; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)

IT Polyoxyalkylenes

(fluorine- and sulfo-contg., ionomers; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)

IT Ceramic membranes

Solid state fuel cells

(innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)

IT Chlorides

Fluoro rubber

Metal alkoxides

Phosphates

Polyesters

(innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)

IT Reactors

(membrane, catalytic; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)

IT Sulfonic acids

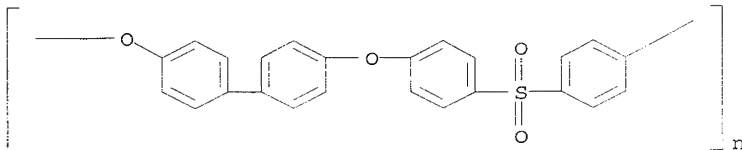
(perfluorosulfonic acid polymers; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)

IT Polyketones

Polysulfones

- (polyether-, sulfonated; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)
- IT Polysulfones
(polyether-, innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)
- IT Polyethers
(polyketone-, sulfonated; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)
- IT Fluoropolymers
(polyoxyalkylene-, sulfo-contg., ionomers; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)
- IT Ionomers
(polyoxyalkylenes, fluorine- and sulfo-contg.; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)
- IT Polyethers
(polysulfone-, sulfonated; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)
- IT Polyethers
(polysulfone-, innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)
- IT Carboxylic acids
(salts; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)
- IT Fluoropolymers
(sulfo-contg., perfluoro; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)
- IT 60-35-5, Acetamide 67-68-5, Dms0 68-12-2, Dmf 75-05-8, Acetonitrile 123-91-1, Dioxan 872-50-4, n-Methyl-2-pyrrolidone 7440-31-5D, Tin, salts 7440-32-6D, Titanium, salts 7440-45-1D, Cerium, salts 7440-67-7D, Zirconium, salts 7699-43-6, Zirconyl chloride 9002-84-0, Ptfе 15477-76-6, phosphonate 24937-79-9, Pvdф 25710-96-7, Zirconium propionate 93615-63-5, nafion 1100
(innovative method for prepn. of proton

- conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)
- IT 13772-29-7DP, solid soln. with zirconium phosphate and phosphonate contg. org. diacids 116405-42-6P
131249-73-5DP, solid soln. with zirconium phosphate and phosphonate contg. org. diacids 608103-65-7DP, solid soln. with zirconium phosphate and phosphonate contg. org. diacids 608103-65-7P
(innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)
- IT 24937-79-9D, Polyvinylidene fluoride, sulfonated (innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)
- IT 67-56-1, Methanol 1333-74-0, Hydrogen (innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)
- L63 ANSWER 3 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:757148 Document No. 139:262063 Aromatic polymer, manufacture and use as fuel cell separator. Yoshimura, Ken; Yashiro, Arihiro; Nodono, Mitsunori (Sumitomo Chemical Company, Limited, Japan). U.S. Pat. Appl. Publ. US 2003180596 A1 20030925, 20 pp. (English). CODEN: USXXCO. APPLICATION: US 2003-395299 20030325. PRIORITY: JP 2002-82967 20020325; JP 2002-195594 20020704.
- AB A polymer electrolyte shows excellent characteristics as proton conductive membrane of fuel cells and the like. This polymer electrolyte contains an arom. polymer characterized by having a super strong acid group in a side chain. The 2-methoxy-1,4-dihydroxybenzene/4,4'-difluorodiphenylsulfone copolymer was modified with potassium pentafluorobenzenesulfonate, and as a membrane had proton cond. 4.4 .times. 10⁻² S/cm.
- IT 25839-81-0DP, brominated, reaction products with potassium iodoctafluorooxapentanesulfonate (acid group-modified arom. polyether polysulfone membrane fuel cell separator)
- RN 25839-81-0 HCAPLUS
CN Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



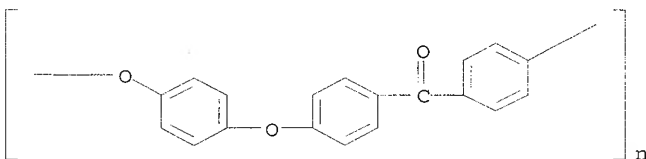
IC ICM H01M008-10
ICS C08J005-22
NCL 429033000; 521027000; 528106000
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 35, 52
IT 882-96-2DP, reaction products with polyether polysulfone
25839-81-0DP, brominated, reaction products with
potassium iodoctafluorooxapentanesulfonate 105198-11-6DP,
reaction products with polyether polysulfone 603951-66-2DP,
reaction products with potassium pentafluorobenzenesulfonate
603951-66-2P
(acid group-modified arom. polyether polysulfone membrane fuel
cell separator)

L63 ANSWER 4 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:738051 Document No. 139:246732 Ion conducting composite
membrane materials containing an optionally modified
zirconium phosphate dispersed in a polymeric matrix, preparation of
membrane material, and use. Bauer, Bernd; Roziere, Jacques;
Jones, Deborah; Alberti, Giulio; Casciola, Mario; Pica, Monica
(Fuma-Tech G.m.b.H., Germany). PCT Int. Appl. WO 2003077340 A2
20030918, 31 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ,
BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ,
EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL,
TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM,
AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI,
CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE,
NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2.
APPLICATION: WO 2003-EP2550 20030312. PRIORITY: IT 2002-PG13
20020313.

AB A polymer is uniformly filled with a Zr phosphate, preferably
.alpha.-Zr phosphate or Zr phosphate sulfoarylenphosphonate
particles. The composite membrane materials are
preferably prep'd. starting from a soln. of a polymer and from a
colloidal dispersion of .alpha.-Zr phosphate or a Zr phosphate
sulfoarylenphosphonate, and by removing the solvent by
evapn. or by a suitable nonsolvent. The colloidal particles are
transferred into the soln. of the polymer preferably by mixing the
dispersion with the soln. or by phase transfer. The ionic
membranes with high overall performance in high temp., esp.

H, are used in indirect MeOH fuel cells and with decreased MeOH crossover in direct MeOH fuel cells

- IT 31694-16-3D, Victrex PEEK, sulfonated
(ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
- RN 31694-16-3 HCAPLUS
- CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (9CI)
(CA INDEX NAME)



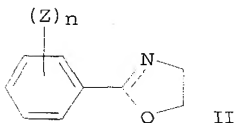
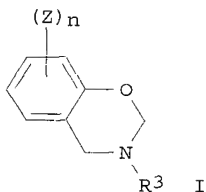
- IC ICM H01M008-00
- CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52
- ST zirconium phosphate ionomer **membrane** proton
conducting fuel cell
- IT **Fuel cells**
(MeOH; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
- IT Polysulfones, uses
(arom., sulfonated; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
- IT **Membranes**, nonbiological
(composite, proton conducting; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
- IT Polyoxyalkylenes, uses
(fluorine- and sulfo-contg., ionomers; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
- IT Polyketones
(polyether-, phthalazinone group-contg.; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
- IT Polyketones
Polysulfones, uses
(polyether-, sulfonated; ion conducting composite **membrane** materials contg. an optionally modified

- zirconium phosphate dispersed in a polymeric matrix)
- IT Polyethers, uses
(polyketone-, phthalazinone group-contg.; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
- IT Polyethers, uses
(polyketone-, sulfonated; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
- IT Fluoropolymers, uses
(polyoxyalkylene-, sulfo-contg., ionomers; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
- IT Ionomers
(polyoxyalkylenes, fluorine- and sulfo-contg.; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
- IT Polyethers, uses
(polysulfone-, sulfonated; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
- IT Fluoropolymers, uses
Polybenzimidazoles
(sulfonated; ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
- IT 107-10-8D, Propylamine, intercalation compd. with zirconium phosphate 13772-29-7D, intercalation compd. with propylamine 13772-29-7D, solid solns. with zirconium **sulfophenylphosphonate** 24937-79-9D, Polyvinylidene fluoride, sulfonated 31694-16-3D, Victrex PEEK, sulfonated 127833-97-0D, solid solns. with zirconium phosphate (ion conducting composite **membrane** materials contg. an optionally modified zirconium phosphate dispersed in a polymeric matrix)
- L63 ANSWER 5 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:628405 Document No. 139:166954 **Proton-conductive polymer membrane** and its use in fuel cell. Kuromatsu, Hidehisa; Minamimura, Kiyoyuki (Kanegafuchi Chemical Industry Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003229143 A2 20030815, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-29044 20020206.
- AB The **membrane** contains polymers having SO₃H-contg. arom. rings and has P content 0.001-5%. The **membrane** has high **proton cond.** and oxidn. resistance and is useful for an electrolyte in a solid polymer fuel cell.
- IC ICM H01M008-02
ICS C08J005-22; C08K003-32; C08L043-02; C08L081-04; C08L101-02; H01M008-10
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 76

- ST fuel cell electrolyte proton
conductive polymer membrane
- IT Polysulfones, uses
(polyether-, arom., sulfonated; proton-
conductive sulfo-contg. arom. ring polymer
membrane for fuel cell electrolyte
with high oxidn. resistance)
- IT Polyethers, uses
(polysulfone-, arom., sulfonated; proton-
conductive sulfo-contg. arom. ring polymer
membrane for fuel cell electrolyte
with high oxidn. resistance)
- IT Fuel cell electrolytes
(proton-conductive sulfo-contg. arom. ring
polymer membrane for fuel cell
electrolyte with high oxidn. resistance)
- IT Ionic conductors
(protonic; proton-conductive
sulfo-contg. arom. ring polymer membrane for
fuel cell electrolyte with high oxidn.
resistance)
- IT Polythiophenylenes
(sulfonated; proton-conductive sulfo-contg.
arom. ring polymer membrane for fuel
cell electrolyte with high oxidn. resistance)
- IT 9016-75-5DP, Poly(phenylene sulfide), sulfonated
(Torelina; proton-conductive sulfo-contg.
arom. ring polymer membrane for fuel
cell electrolyte with high oxidn. resistance)
- IT 1343-93-7 27754-99-0, Poly(vinylphosphonic acid)
(membrane contg.; proton-conductive
sulfo-contg. arom. ring polymer membrane for
fuel cell electrolyte with high oxidn.
resistance)
- IT 25667-42-9DP, sulfonated
(proton-conductive sulfo-contg. arom. ring
polymer membrane for fuel cell
electrolyte with high oxidn. resistance)

L63 ANSWER 6 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
 2003:586587 Document No. 139:152288 Thermally crosslinkable polymer
 solid electrolyte for fuel cell, polymer solid
 electrolyte film, and manufacture thereof. Kitamura, Kota; Takase,
 Satoshi; Sakaguchi, Yoshimitsu; Nagahara, Shigenori; Hamamoto,
 Shiro; Nakao, Junko (Toyobo Co., Ltd., Japan). Jpn. Kokai Tokkyo
 Koho JP 2003217343 A2 20030731, 9 pp. (Japanese). CODEN: JKXXAF.
 APPLICATION: JP 2002-15987 20020124.

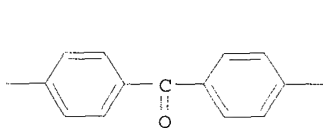
GI



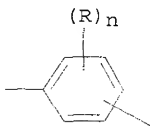
- AB The thermally crosslinkable polymer solid electrolyte has .gtoreq.1 ionic group and .gtoreq.1 thermally crosslinkable group in the mol. The ionic group may be sulfonic acid or phosphonic acid group. Thermally crosslinkable group may be -C6H4(Z)n-C.tplbond.R1, -C6H4(Z)n-OCH2-C.tplbond.R2, I -C6H4(Z)n-CR6=CR4R5, CH2-CR9=CR8R7, or II (Z = mH, C12-10 hydrocarbon, halo, etc.; R1-9 = H, C1-10 alkyl, Ph, etc.; X = H, monovalent metal ion; and n = integer 1-4). The polymer backbone chain may be polyethersulfone or polyether ketone.
- IC ICM H01B001-06
ICS C08G065-40; C08G075-23; C08J005-22; H01B013-00; H01M008-02; H01M008-10
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 35, 38
- ST thermally crosslinkable polymer solid electrolyte fuel cell
- IT Polyketones
Polysulfones, uses
(polyether-; thermally crosslinkable polymer solid electrolyte for fuel cell)
- IT Polyethers, uses
(polyketone-; thermally crosslinkable polymer solid electrolyte for fuel cell)
- IT Polyethers, uses
(polysulfone-; thermally crosslinkable polymer solid electrolyte for fuel cell)
- IT Fuel cell electrolytes
Fuel cells
(thermally crosslinkable polymer solid electrolyte for fuel cell)
- IT 569346-21-ODP, Disodium 4,4'-dichlorodiphenylsulfone-3,3'-disulfonate-4,4'-dichlorodiphenylsulfone-biphenol copolymer, reaction product with 4-ethynylphenol
(crosslinked; thermally crosslinkable polymer solid electrolyte for fuel cell)
- L63 ANSWER 7 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:586586 Document No. 139:124155 Photocrosslinkable polymer solid electrolyte for fuel cell proton exchange film, photocrosslinking polymer solid electrolyte film, and manufacture

thereof, . Kitamura, Kota; Takase, Satoshi; Sakaguchi, Yoshimitsu; Nagahara, Shigenori; Hamamoto, Shiro; Nakao, Junko (Toyobo Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003217342 A2 20030731, 8 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-15986 20020124.

GI



I



II

- AB The photocrosslinking polymer solid electrolyte contains .gtoreq.1 ionic group and .gtoreq.1 photocrosslinkable group om the mol. The ionic group may be sulfonic acid or phosphonic acid. The photocrosslinkable group may be represented by I and II (R = C1-10 aliph. hydrocarbon; and n = integer 1-4). The polymer backbone chain may be polyethersulfone or polyether ketone. The photocrosslinking polymer solid electrolyte exhibited not only excellent ionic cond. but also showed swelling resistance.
- IC ICM H01B001-06
ICS C08G065-40; C08G075-23; H01B013-00; H01M008-02; H01M008-10
- CC 72-2 (Electrochemistry)
Section cross-reference(s): 35, 38
- ST photocrosslinkable polymer solid electrolyte **fuel cell** proton exchange film; polyethersulfone polyether ketone polymer solid electrolyte
- IT **Fuel cells**
Polymer electrolytes
(photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film)
- IT Polyketones
Polysulfones, uses
(polyether-; photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film)
- IT Polyethers, uses
(polyketone-; photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film)
- IT **Polyethers**, uses
(polysulfone-; photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film)
- IT 565221-52-5P
(photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film)

L63 ANSWER 8 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:550271 Document No. 139:119897 Polymer electrolyte composition
and proton-conductive membrane for fuel cell. Okaniwa, Motoki;
Goto, Kohei (JSR Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003201403
A2 20030718, 21 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP
2002-2793 20020109.

AB The compn. contains a polymer electrolyte and an antioxidant contg.
(a) .gtoreq.1 compd. selected from a phenolic OH-contg. compd. and
an amine and (b) an org. P or org. S compd. except the phenols or
amines. The proton-conductive membrane is that made of the compn.
showing enhancement of resistance to oxidn. by H2O2 radical
(generated in fuel cells) without affecting proton cond. and mech.
strength.

IT 463963-71-5DP, sulfonated
(polymer electrolyte compn. contg. antioxidant for
proton-conductive membrane in fuel cell)

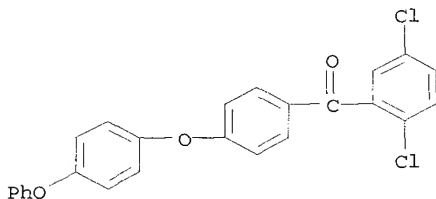
RN 463963-71-5 HCAPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)[4-
(4-phenoxyphenoxy)phenyl]methanone and 4,4'-[2,2,2-trifluoro-1-
(trifluoromethyl)ethylidene]bis[phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 463954-50-9

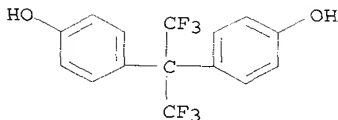
CMF C25 H16 Cl2 O3



CM 2

CRN 1478-61-1

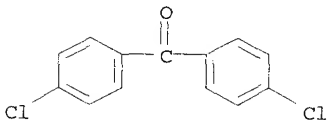
CMF C15 H10 F6 O2



CM 3

CRN 90-98-2

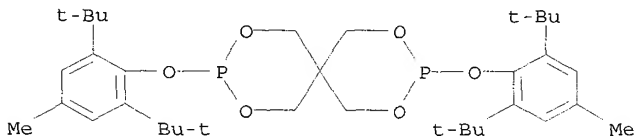
CMF C13 H8 Cl2 O



IT 80693-00-1, Bis[2,6-di(tert-butyl)-4-methylphenyl]pentaerythritol diphosphite
(polymer electrolyte compn. contg. antioxidant for
proton-conductive membrane in fuel cell)

RN 80693-00-1 HCAPLUS

CN 2,4,8,10-Tetraoxa-3,9-diphosphaspiro[5.5]undecane,
3,9-bis[2,6-bis(1,1-dimethylethyl)-4-methylphenoxy]- (9CI) (CA
INDEX NAME)



IC ICM C08L101-00

ICS C08G065-12; C08K005-13; C08K005-17; C08K005-36; C08K005-49;
C08L071-00; C25B013-08; H01M008-02; H01M008-10

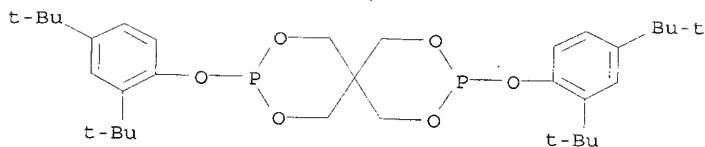
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

IT 364062-39-5DP, 4,4'-Dichlorobenzophenone-2,5-Dichloro-4'-
phenoxybenzophenone copolymer, sulfonated 463963-71-5DP,
sulfonated
(polymer electrolyte compn. contg. antioxidant for

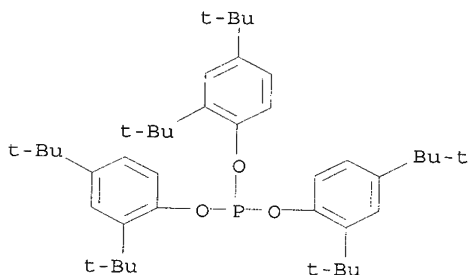
- proton-conductive membrane in fuel cell)
- IT 693-36-7, Distearyl-3,3'-thiodipropionate 1455-42-1D,
3,9-Bis(2-hydroxy-1,1-dimethylethyl)-2,4,8,10-
tetraoxaspiro[5.5]undecane, ester mixt. 1703-58-8D,
1,2,3,4-Butanetetra-carboxylic acid, ester mixt. 1709-70-2,
1,3,5-Trimethyl-2,4,6-tris[3,5-di(tert-butyl)-4-
hydroxybenzyl]benzene 2403-89-6D, 1,2,2,6,6-Pentamethyl-4-
piperidinol, ester mixt. 6683-19-8, Pentaerythrityl
tetrakis[3-[3,5-di(tert-butyl)-4-hydroxyphenyl]propionate]
27676-62-6, Tris[3,5-di(tert-butyl)-4-hydroxybenzyl] isocyanurate
29598-76-3 80693-00-1, Bis[2,6-di(tert-butyl)-4-
methylphenyl]pentaerythritol diphosphate 561307-00-4
(polymer electrolyte compn. contg. antioxidant for
proton-conductive membrane in fuel cell)
- L63 ANSWER 9 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:173096 Document No. 138:207828 Polymer electrolyte composition
and fuel cell. Hidaka, Yasuaki; Iwasaki, Katsuhiko (Sumitomo
Chemical Company, Limited, Japan). Eur. Pat. Appl. EP 1289041 A2
20030305, 23 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR,
GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY,
AL, TR, BG, CZ, EE, SK. (English). CODEN: EPXXDW. APPLICATION: EP
2002-17695 20020807. PRIORITY: JP 2001-241897 20010809; JP
2001-261127 20010830.
- AB A polymer electrolyte compn. comprising a polymer electrolyte and at
least one of antioxidant selected from a group which consists of an
antioxidant contg. trivalent phosphorous and a sulfur-contg.
antioxidant is provided as a polymer electrolyte compn. superior in
radical resistance property.
- IT 3806-34-6, ADK Stab PEP-8 26741-53-7, Ultrinox 626
31570-04-4, Sumilizer P-16 80693-00-1
140221-14-3
(antioxidant; polymer electrolyte compn. and fuel cell)
- RN 3806-34-6 HCAPLUS
CN 2,4,8,10-Tetraoxa-3,9-diphosphaspiro[5.5]undecane,
3,9-bis(octadecyloxy)- (9CI) (CA INDEX NAME)



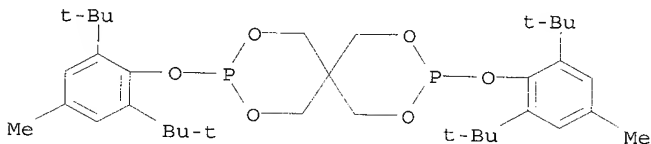
- RN 26741-53-7 HCAPLUS
CN 2,4,8,10-Tetraoxa-3,9-diphosphaspiro[5.5]undecane,
3,9-bis[2,4-bis(1,1-dimethylethyl)phenoxy]- (9CI) (CA INDEX NAME)



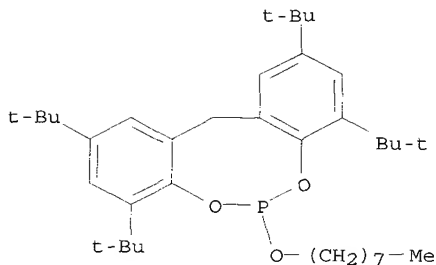
RN 31570-04-4 HCAPLUS
 CN Phenol, 2,4-bis(1,1-dimethylethyl)-, phosphite (3:1) (9CI) (CA INDEX NAME)



RN 80693-00-1 HCAPLUS
 CN 2,4,8,10-Tetraoxa-3,9-diphosphaspiro[5.5]undecane,
 3,9-bis[2,6-bis(1,1-dimethylethyl)-4-methylphenoxy]- (9CI) (CA INDEX NAME)



RN 140221-14-3 HCAPLUS
 CN 12H-Dibenzo[d,g][1,3,2]dioxaphosphocin, 2,4,8,10-tetrakis(1,1-dimethylethyl)-6-(octyloxy)- (9CI) (CA INDEX NAME)

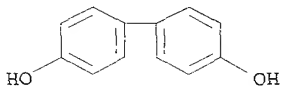


IT 83094-08-0DP, 4,4'-Dichlorodiphenyl sulfone-4,4'-
 dihydroxybiphenyl-4,4'-dihydroxydiphenyl sulfone copolymer,
 sulfonated
 (polymer electrolyte compn. and fuel cell)
 RN 83094-08-0 HCAPLUS
 CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-
 chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 92-88-6

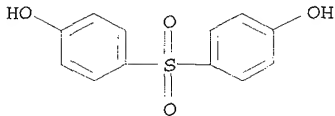
CMF C12 H10 O2



CM 2

CRN 80-09-1

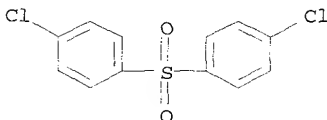
CMF C12 H10 O4 S



CM 3

CRN 80-07-9

CMF C12 H8 C12 O2 S



- IC ICM H01M008-10
ICS C08K005-00
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
- IT 85-60-9, SUMILIZER BBM-S 96-69-5, SUMILIZER WX-R 123-28-4,
SUMILIZER TPL-R 693-36-7, SUMILIZER TPS 3806-34-6, ADK
Stab PEP-8 16545-54-3, SUMILIZER TPM 26741-53-7,
Ultrinox 626 29598-76-3, SUMILIZER TP-D 31570-04-4,
Sumilizer P-16 80693-00-1 140221-14-3
147192-62-9, GSYP-101 153550-59-5, Sandostab P-EPQ 203255-81-6,
Sumilizer GP
(antioxidant; polymer electrolyte compn. and fuel cell)
- IT 90-43-7DP, [1,1'-Biphenyl]-2-ol, polymer contg., reaction product
with hydroxy-terminated polyether sulfone and 4,4'-
difluorobenzophenone, sulfonated 92-88-6DP, [1,1'-Biphenyl]-4,4'-
diol, polymer contg., reaction product with hydroxy-terminated
polyether sulfone and 4,4'-difluorobenzophenone, sulfonated
345-92-6DP, polymer contg., reaction product with hydroxy-terminated
polyether sulfone and 4,4'-difluorobenzophenone, sulfonated
25667-42-9DP, Sumikaexcel PES 5003P, polymer contg., reaction
product with hydroxy-terminated polyether sulfone and
4,4'-difluorobenzophenone, sulfonated 83094-08-0DP,
4,4'-Dichlorodiphenyl sulfone-4,4'-dihydroxybiphenyl-4,4'-
dihydroxydiphenyl sulfone copolymer, sulfonated
(polymer electrolyte compn. and fuel cell)

L63 ANSWER 10 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN

2002:650050 Document No. 137:170014 **Bromination** of aromatic
polyethers for high yield at mild condition. Sasaki, Shigeru
(Sumitomo Chemical Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP
2002241493 A2 20020828, 4 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 2001-38116 20010215. *foreign application*

AB The polymers shown as $(C_6H_4ZC_6H_4O)_x(ArO)_y$ $Z = SO_2, CO$; $x, y =$
0.01-0.99; $x + y = 1$; $Ar =$ (heteroelement-contg.) divalent arom.
C4-18 group] in org. solvents are **brominated** with
N-bromosuccinimide in the presence of strong acids. Thus,
(p-C₆H₄SO₂-p-C₆H₄O) 0.85 (p-C₆H₄C₆H₄-p-O) 0.15 was reacted with
N-bromosuccinimide in CH₂Cl₂ in the presence of H₂SO₄ and further

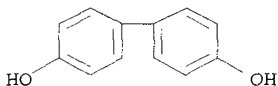
processed to give a brominated polymer.

IT 83094-08-0DP, 4,4'-Biphenol-4,4'-dichlorodiphenyl
sulfone-4,4'-dihydroxydiphenyl sulfone copolymer, brominated
(bromination of arom. polyethers with bromosuccinimide
for high yield at mild condition)
RN 83094-08-0 HCAPLUS
CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-
chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 92-88-6

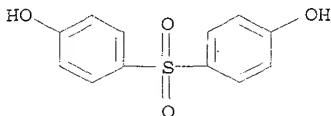
CMF C12 H10 O2



CM 2

CRN 80-09-1

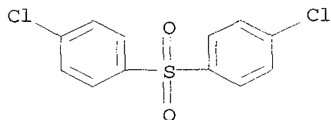
CMF C12 H10 O4 S



CM 3

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



IC ICM C08G065-48

- CC 35-8 (Chemistry of Synthetic High Polymers)
- ST arom polyether polysulfone **bromination** bromosuccinimide
- IT **Bromination**
(**bromination** of arom. polyethers with bromosuccinimide
for high yield at mild condition)
- IT Polysulfones, preparation
(polyether-, arom., **brominated**; **bromination**
of arom. polyethers with bromosuccinimide for high yield at mild
condition)
- IT Polyethers, preparation
(polysulfone-, arom., **brominated**; **bromination**
of arom. polyethers with bromosuccinimide for high yield at mild
condition)
- IT 7664-93-9, Sulfuric acid, uses
(**bromination** of arom. polyethers with bromosuccinimide
for high yield at mild condition)
- IT 128-08-5DP, N-Bromosuccinimide, reaction products with
polyether-polysulfones 25608-63-3DP, **brominated**
25667-42-9DP, **brominated** 83094-08-0DP,
4,4'-Biphenol-4,4'-dichlorodiphenyl sulfone-4,4'-dihydroxydiphenyl
sulfone copolymer, **brominated**
(**bromination** of arom. polyethers with bromosuccinimide
for high yield at mild condition)
- IT 75-09-2, Methylene chloride, uses
(solvent; **bromination** of arom. polyethers with
bromosuccinimide for high yield at mild condition)

- L63 ANSWER 11 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
- 2002:392080 Document No. 136:387796 Isoelectric gateways and method
and apparatus for using same.. Vigh, Gyula (USA). U.S. Pat. Appl.
Publ. US 2002060154 A1 20020523, 13 pp. (English). CODEN: USXXCO.
APPLICATION: US 2001-990549 20011121. PRIORITY: AU 2000-1614
20001122.
- AB This invention is directed to isoelec. gateways for use in the
alteration of the compn. of the sample wherein the buffering
capacity of such isoelec. gateways is not as limited as in an
isoelec. **membrane** and the isoelec. gateways are suitably
used in anal. and preparative-scale isoelec. focusing sepns., or in
the alteration of the compn. of solns. that contain at least one
amphoteric substance. The isoelec. gateway is comprised of a first
ion-permeable barrier; a second ion-permeable barrier at a predetd.
distance apart from the first ion-permeable barrier so as to define
a space therebetween; and an isoelec. substance disposed between the
first and second ion-permeable barriers, wherein the isoelec.
substance has a characteristic pI value and a good buffering
capacity and adequate cond. around its characteristic pI value, and
wherein the ion-permeable barriers substantially prevent convective
mixing between the contents of the isoelec. gateway and its
environment.
- IC ICM G01N027-26
- ICS G01N027-447
- NCL 204459000

CC 47-2 (Apparatus and Plant Equipment)
 Section cross-reference(s): 9, 63, 76, 80

ST isoelec gateway app; sepn isoelec focusing app; preparative isoelec
 focusing sepn app; **membrane** isoelec sepn app; analysis
 isoelec focusing sep

IT Gels
Membranes, nonbiological
 (isoelec. or non-ionic, ion-permeable barriers; isoelec. gateways
 and method and app. for using same)

IT Filter paper
 Paper
 (**membrane** supports; isoelec. gateways and method and
 app. for using same)

IT Acrylic polymers, uses
 Polysulfones, uses
 (**membranes**; isoelec. gateways and method and app. for
 using same)

IT Polysulfones, uses
 (**polyether-**, **membranes**; isoelec. gateways and
 method and app. for using same)

IT Screens (mesh)
 (polymeric, **membrane** supports; isoelec. gateways and
 method and app. for using same)

IT Polyethers, uses
 (**polysulfone-**, **membranes**; isoelec. gateways
 and method and app. for using same)

IT 9003-05-8, Polyacrylamide
 (cross-linked, **membranes**; isoelec. gateways and method
 and app. for using same)

IT 2817-45-0D, Amino **phosphonic** acid, derivs.
 (isoelec. substance; isoelec. gateways and method and app. for
 using same)

IT 9004-34-6D, Cellulose, esters
 (**membranes**; isoelec. gateways and method and app. for
 using same)

IT 9002-18-0, Agar
 (supported **membranes** contg.; isoelec. gateways and
 method and app. for using same)

L63 ANSWER 12 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
 2001:713743 Document No. 135:259849 Method of fabrication of
 membrane/electrode composite for fuel cell. Charnock, Peter;
 Wilson, Brian (Victrex Manufacturing Limited, UK). PCT Int. Appl.
 WO 2001071835 A2 20010927, 51 pp. DESIGNATED STATES: W: AE, AG,
 AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
 CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL,
 IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
 MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK,
 SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY,
 KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY,
 DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT,
 SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO

2001-GB1244 20010321. PRIORITY: GB 2000-6878 20000322; GB 2000-31211 20001221.

AB A method of manufg. a membrane/electrode composite of a type which includes a catalyst material on a first material which comprises a first conductive polymer includes a step of contacting the first material comprising the first conductive polymer with a polar protic solvent (e.g. sulfuric acid, a sulfonic acid, hydrofluoric acid or phosphoric acid) and causing catalyst material to deposit on the first material. The composite may be used in an electrochem. device, for example a fuel cell.

IT 128324-23-2DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxybenzophenone copolymer, sulfonated 128324-24-3DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer, sulfonated

(method of fabrication of membrane/electrode composite for fuel cell)

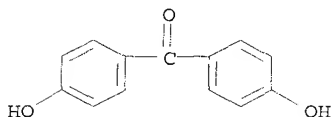
RN 128324-23-2 HCAPLUS

CN Methanone, bis(4-fluorophenyl)-, polymer with [1,1'-biphenyl]-4,4'-diol and bis(4-hydroxyphenyl)methanone (9CI) (CA INDEX NAME)

CM 1

CRN 611-99-4

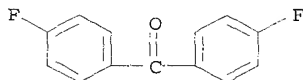
CMF C13 H10 O3



CM 2

CRN 345-92-6

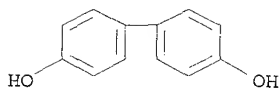
CMF C13 H8 F2 O



CM 3

CRN 92-88-6

CMF C12 H10 O2



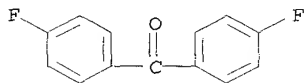
RN 128324-24-3 HCAPLUS

CN Methanone, bis(4-fluorophenyl)-, polymer with [1,1'-biphenyl]-4,4'-diol and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 345-92-6

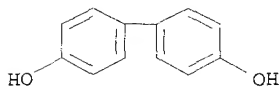
CMF C13 H8 F2 O



CM 2

CRN 92-88-6

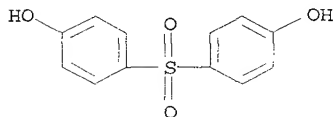
CMF C12 H10 O2



CM 3

CRN 80-09-1

CMF C12 H10 O4 S

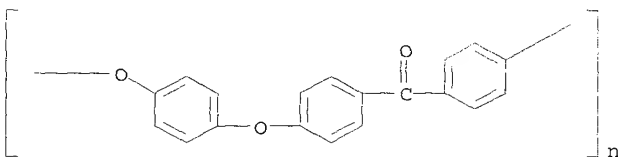


- IC ICM H01M008-02
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
- IT 128324-23-2DP, 4,4'-Difluorobenzophenone-4,4'-
dihydroxybiphenyl-4,4'-dihydroxybenzophenone copolymer, sulfonated
128324-24-3DP, 4,4'-Difluorobenzophenone-4,4'-
dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer,
sulfonated
(method of fabrication of membrane/electrode composite for fuel
cell)
- IT 7664-38-2, Phosphoric acid, uses 7664-39-3, Hydrofluoric acid,
uses 7664-93-9, Sulfuric acid, uses 9003-01-4 26101-52-0,
Polyvinyl sulfonic acid 27754-99-0, Polyvinyl **phosphonic**
acid 50851-57-5, Polystyrene sulfonic acid 264624-35-3
(method of fabrication of membrane/electrode composite for fuel
cell)
- L63 ANSWER 13 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2001:670069 Document No. 135:372092 Synthesis and **proton**
conductivities of phosphonic acid containing
poly-(arylene ether)s. Meng, Y. Z.; Tjong, S. C.; Hay, A. S.; Wang,
S. J. (Guangzhou Institute of Chemistry, Chinese Academy of
Sciences, Canton, 510650, Peop. Rep. China). Journal of Polymer
Science, Part A: Polymer Chemistry, 39(19), 3218-3226 (English)
2001. CODEN: JPACEC. ISSN: 0887-624X. Publisher: John Wiley &
Sons, Inc..
- AB A novel **phosphonic acid contg. bisphenol** was successfully
synthesized from phenolphthalein and m-aminophenyl**phosphonic**
acid. A series of homo- and copoly(arylene ether)s contg.
phosphonic acid groups were prep'd. by soln. nucleophilic
polycondensation. These **phosphonic acid-contg. polymers**
can readily be dissolved in common org. solvents, such as DMSO,
N-methyl-2-pyrrolidinone, and N-cyclohexylpyrrolidinone, and can be
cast into tough and smooth films. The presence of
phosphonic acid pendants in the poly(arylene ether)s was
confirmed by NMR, matrix-assisted laser desorption/ionization
time-of-flight mass spectrometry, and cond. measurements. These
poly(arylene ether)s had very high glass transition temps. ranging
from 254.degree. to >315.degree. and high mol. wts. The
conductivities of the synthesized polymers were analyzed by the
Cole-Cole method, and they ranged from 10⁻⁵ to 10⁻⁶ S cm⁻¹. The
synthesized polymers also exhibited good soln. processability.
- CC 35-5 (Chemistry of Synthetic High Polymers)
- ST polyether arom **phosphonic acid contg; polyarylene ether**
phosphonic acid contg; ionic cond phosphonic acid
contg polyether
- IT Polymerization
(of **phosphonic acid-contg. bisphenol** with
bis(fluorophenyl) sulfone)
- IT Absorption
(of water; by **phosphonic acid-contg. arom. polyethers**)

- IT Polysulfones, preparation
(polyether-, phosphonic acid group-contg.;
synthesis and proton conductivities of
phosphonic acid-contg. arom. polyethers)
 - IT Polyethers, preparation
(polysulfone-, phosphonic acid group-contg.;
synthesis and proton conductivities of
phosphonic acid-contg. arom. polyethers)
 - IT Ionic conductivity
(proton; synthesis and proton
conductivities of phosphonic acid-contg. arom.
polyethers)
 - IT 7732-18-5, Water, processes
(absorption; of phosphonic acid-contg. arom.
polyethers)
 - IT 81-90-3P, Phenolphthalin 142717-68-8P 294212-76-3P
(intermediate; in synthesis of phosphonic acid-contg.
bisphenol for prepn. of arom. polyethers)
 - IT 374594-34-0
(monomer; for prepn. of phosphonic acid-contg. arom.
polyethers)
 - IT 77-09-8, Phenolphthalein
(reactant; in synthesis of phosphonic acid-contg.
bisphenol for prepn. of arom. polyethers)
 - IT 5427-30-5P, 3-Aminophenylphosphonic acid
(reactant; in synthesis of phosphonic acid-contg.
bisphenol for prepn. of arom. polyethers)
 - IT 374594-35-1P, Bisphenol A-bis(4-fluorophenyl) sulfone-[3-[4,9-bis(4-
hydroxyphenyl)-1,3-dioxo-1,3-dihydrobenzo[f]isoindol-2-yl]phenyl]
phosphonic acid copolymer 374594-36-2P 374594-37-3P
(synthesis and proton conductivities of
phosphonic acid-contg. arom. polyethers)
- L63 ANSWER 14 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2001:472016 Document No. 135:62388 Solid polymer electrolyte having
high-durability. Suzuki, Takahisa; Taniguchi, Takumi; Morimoto, Yu;
Kawasumi, Masaya; Hasegawa, Naoki; Kamiya, Atsushi (Kabushiki Kaisha
Toyota Chuo Kenkyusho, Japan). Eur. Pat. Appl. EP 1110992 A1
20010627, 37 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR,
GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO.
(English). CODEN: EPXXDW. APPLICATION: EP 2000-126079 20001129.
PRIORITY: JP 1999-337015 19991129.
- AB In solid polymer electrolyte having high-durability, comprising a
polymer electrolyte material having a hydrocarbon part, a chelate
group and an electrolyte group are introduced into the polymer
electrolyte material. The chelate group contains a
phosphonic acid group, nitrogen, both of nitrogen and a
phosphonic acid group (one or more selected from the group
consisting of alkylamino monophosphonic acid groups,
alkylamino diphosphonic acid groups, dialkylamino
monophosphonic acid groups, alkylalkylene diamine
triphosphonic acid groups, and alkylimino phosphonic

acid groups) or, both of nitrogen and a carboxylic acid group (one or more selected from the group consisting of alkylamino monocarboxylic acid groups, alkylamino dicarboxylic acid groups, dialkylamino monocarboxylic acid groups, alkylalkylene diamine tricarboxylic acid groups, and alkylimino carboxylic acid groups).

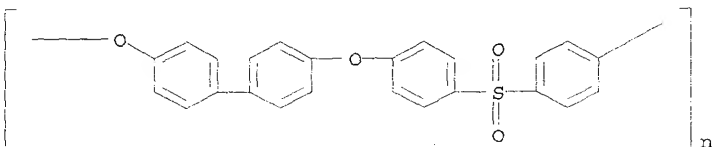
- IT 31694-16-3DP, PEEK, **phosphonated**
(solid polymer electrolyte having high-durability)
- RN 31694-16-3 HCAPLUS
- CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (9CI)
(CA INDEX NAME)



- IC ICM C08J005-22
- ICS H01M008-10; H01M008-02; C08J005-20
- CC 38-3 (Plastics Fabrication and Uses)
- Section cross-reference(s): 52
- ST polyelectrolyte membrane fuel cell;
ethylene styrene tetrafluoroethylene graft copolymer
polyelectrolyte; chelating group polyelectrolyte
- IT **Polysulfones**, uses
(polyether-, **phosphonated**; solid polymer
electrolyte having high-durability)
- IT **Polysulfones**, uses
(polyether-, sulfonated; solid polymer electrolyte
having high-durability)
- IT **Polyethers**, uses
(polysulfone-, **phosphonated**; solid polymer
electrolyte having high-durability)
- IT **Polyethers**, uses
(polysulfone-, sulfonated; solid polymer electrolyte
having high-durability)
- IT **Fuel cells**
Membranes, nonbiological
Polyelectrolytes
(solid polymer electrolyte having high-durability)
- IT 31694-16-3DP, PEEK, **phosphonated**
31694-16-3DP, PEEK, sulfonated 197895-58-2DP,
Ethylene-styrene-tetrafluoroethylene graft copolymer,
diethylphosphonated 197895-58-2DP, Ethylene-styrene-
tetrafluoroethylene graft copolymer, sulfonated
(solid polymer electrolyte having high-durability)
- IT 27754-99-0, Poly(vinylphosphonic acid)

(solid polymer electrolyte having high-durability)

- L63 ANSWER 15 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
 2001:456059 Document No. 135:181075 Modified polysulfones. IV.
 Synthesis and characterization of polymers with silicon substituents
 for a comparative study of gas-transport properties. Guiver,
 Michael D.; Robertson, Gilles P.; Rowe, Sheri; Foley, Stephen; Kang,
 Yong Soo; Park, Hyun Chae; Won, Jongok; Le Thi, Hoai Nam (Institute
 for Chemical Process and Environmental Technology, National Research
 Council of Canada, Ottawa, ON, K1A 0R6, Can.). Journal of Polymer
 Science, Part A: Polymer Chemistry, 39(13), 2103-2124 (English)
 2001. CODEN: JPACEC. ISSN: 0887-624X. Publisher: John Wiley &
 Sons, Inc..
- AB We previously conducted a detailed study of gas-transport and other
 properties of a series of silicon derivs. of Udel polysulfone (PSf)
 and Radel polyphenylsulfone; we now report the details of their
 prepn. by the reaction of lithiated polymer intermediates with
 chlorosilylalkylaryl electrophiles. Ortho-sulfone-substituted
 polymers with pendant trimethylsilyl, dimethylphenylsilyl, and
 diphenylmethylsilyl and other groups were obtained by direct
 metalation followed by the reaction of the dilithiated intermediate
 with the appropriate silyl electrophile. In addn., the structural
 regularity and geometry of the dilithiated site was also exploited
 to introduce silicon into the main chain by the reaction of
 dichlorosilyl electrophiles, leading to the formation of a new
 tricyclic heteroatom ring. Ortho-ether PSf derivs. were obtained
 from a dibrominated polymer via the lithiation of brominated
 polymer and reaction with a silyl electrophile. The degree of
 substitution of the silyl groups was 2.0 or less from dilithiated
 polymers and was dependent on the electrophile reactivity and
 reaction conditions. A detailed structural characterization of the
 polymers by NMR and IR spectroscopy is reported in addn. to
 glass-transition temps. and thermal stabilities.
- IT 25839-81-0D, Radel R 5000, trialkylsilyl-contg.
 (modified polysulfones with silicon substituents)
- RN 25839-81-0 HCAPLUS
- CN Poly(oxy[1,1'-biphenyl]-4,4'-diyl-oxy-1,4-phenylenesulfonyl-1,4-
 phenylene) (9CI) (CA INDEX NAME)



- CC 35-8 (Chemistry of Synthetic High Polymers)
- IT 25839-81-0D, Radel R 5000, trialkylsilyl-contg.
 (modified polysulfones with silicon substituents)

- L63 ANSWER 16 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
 2001:38911 Document No. 135:46847 Dielectric properties of polysulfone Udel P-1700 containing **phosphonic** groups. Ziaja, Jan; Balogh, Laszlo; Trochimczuk, Witold M. (Inst. Podstaw Elektrotech. i Elektrotechnol., Politech. Wroclawska, Wroclaw, 50-377, Pol.). Prace Naukowe Instytutu Podstaw Elektrotechniki i Elektrotechnologii Politechniki Wroclawskiej, 34, 153-156 (Polish) 1998. CODEN: PNIPA3. ISSN: 0370-0852. Publisher: Oficyna Wydawnicza Politechniki Wroclawskiej.
- AB **Polyether-polysulfone** UDEL P-1700 (PSU) modified by chlorophosphorylation, hydrolysis, and oxidn. to obtain **phosphonic** groups (PSU-PO(OH)₂) was subjected to dielec. properties measurements. PSU has been recently applied in **membrane** process because of its high glass temp. The addnl. advantage of the PSU and its derivs. application in the **membrane** process is that they do not need to be crosslinked. Measurements were carried out on the phosphorylated PSU (substitution rate 0.26, 0.56 and 0.97) in the form of porous **membranes** 0.08-0.18mm thick. The effect of the substitution degree on dielec. properties of phosphorylated PSU was detd.
- CC 37-5 (Plastics Manufacture and Processing)
 Section cross-reference(s): 38, 76
- ST **polyether polysulfone phosphonic** group
- IT **membrane** dielec property
- IT Dielectric constant
 Dielectric loss
 Electric resistance
 Membranes, nonbiological
 (dielec. properties of **polyether-polysulfone** contg. **phosphonic** groups)
- IT Polymer morphology
 (morphol. and dielec. properties of **polyether-polysulfone** contg. **phosphonic** groups)
- IT **Polysulfones**, properties
 (**polyether**-, dielec. properties of **polyether-polysulfone** contg. **phosphonic** groups)
- IT **Polyethers**, properties
 (**polysulfone**-, dielec. properties of **polyether-polysulfone** contg. **phosphonic** groups)
- IT 25135-51-7D, Udel P 1700, **phosphonic** group-contg.
 (dielec. properties of **polyether-polysulfone** contg. **phosphonic** groups)
- L63 ANSWER 17 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
 2000:260778 Document No. 132:294808 Composite solid polymer electrolyte **membranes**. Formato, Richard M.; Kovar, Robert F.; Osenar, Paul; Landrau, Nelson; Rubin, Leslie S. (Foster-Miller, Inc., USA). PCT Int. Appl. WO 2000022684 A2 20000420, 95 pp. DESIGNATED STATES: W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK,

MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG.

(English). CODEN: PIXXD2. APPLICATION: WO 1999-US19476 19990826.

PRIORITY: WO 1998-US17898 19980828; US 1999-261349 19990303.

- AB The present invention relates to composite solid polymer electrolyte **membranes** (SPEMs) which include a porous polymer substrate (typically a liq. crystal polymer) interpenetrated with an ion-conducting material (typically a perfluorinated ionomer). SPEMs of the present invention are useful in electrochem. applications, including **fuel cells** and electrodialysis.
- IC ICM H01M
- CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52
- ST composite solid polymer electrolyte **membrane**; **fuel cell** polymer electrolyte **membrane**; electrodialysis polymer electrolyte **membrane**; liq crystal polymer interpenetrating network electrolyte; perfluorinated ionomer interpenetrating network electrolyte
- IT Pervaporation
(app.; composite solid polymer electrolyte **membranes**)
- IT Polyamides, uses
Polyketones
(arom.; composite solid polymer electrolyte **membranes**)
- IT Dialyzers
Electrolytic cells
Interpenetrating polymer networks
Liquid crystals, polymeric
Primary batteries
(composite solid polymer electrolyte **membranes**)
- IT Polybenzimidazoles
Polybenzothiazoles
Polybenzoxazoles
Polyimides, uses
Polyoxyphenylenes
Polyphenyls
Polysulfones, uses
Polythiophenylenes
(composite solid polymer electrolyte **membranes**)
- IT **Fuel cells**
(direct methanol or hydrogen; composite solid polymer electrolyte **membranes**)
- IT Dialyzers
(electrodialyzers; composite solid polymer electrolyte **membranes**)
- IT Polyimides, uses
Polyimides, uses
(fluorine-contg.; composite solid polymer electrolyte **membranes**)
- IT Ionomers
(fluoropolymers; composite solid polymer electrolyte

membranes)
IT Fluoropolymers, uses
(ionomers; composite solid polymer electrolyte membranes)
IT Polymer electrolytes
(membrane; composite solid polymer electrolyte membranes)
IT Polyimides, uses
Polyimides, uses
Polyketones
Polyketones
Polysulfones, uses
Polysulfones, uses
(polyether-; composite solid polymer electrolyte membranes)
IT Fluoropolymers, uses
Fluoropolymers, uses
(polyimide-; composite solid polymer electrolyte membranes)
IT Polyethers, uses
Polyethers, uses
(polyimide-; composite solid polymer electrolyte membranes)
IT Polyethers, uses
Polyethers, uses
(polyketone-; composite solid polymer electrolyte membranes)
IT Polyquinoxalines
(polyphenylquinoxalines; composite solid polymer electrolyte membranes)
IT Polysulfones, uses
Polysulfones, uses
(polysulfide-, arom.; composite solid polymer electrolyte membranes)
IT Polysulfides
Polysulfides
(polysulfone-, arom.; composite solid polymer electrolyte membranes)
IT Polyethers, uses
Polyethers, uses
(polysulfone-; composite solid polymer electrolyte membranes)
IT Membranes, nonbiological
(solid polymer electrolyte; composite solid polymer electrolyte membranes)
IT Plastics, uses
(thermoplastics; composite solid polymer electrolyte membranes)
IT Plastics, uses
(thermosetting; composite solid polymer electrolyte membranes)
IT 25667-42-9DP, sulfonated

(Ultrason; composite solid polymer electrolyte membranes)

- IT 25135-51-7DP, Udel, sulfonated 25212-74-2DP, PPS, sulfonated
63496-24-2P, Nafion EW100 154281-38-6DP, Radel R, sulfonated
220998-11-8P, 4,4'-(Hexafluoroisopropylidene)bis(phthalic
anhydride-m-Phenylenediamine-sodium 2,4-diaminobenzenesulfonate
copolymer
(composite solid polymer electrolyte membranes)
IT 88-63-1P, 2,4-Diaminobenzenesulfonic acid 3177-22-8P, Sodium
2,4-diaminobenzenesulfonate
(composite solid polymer electrolyte membranes)
IT 9003-01-4, Polyacrylic acid 24938-64-5 24938-67-8,
Poly[oxy(2,6-dimethyl-1,4-phenylene)] 24938-68-9,
2,6-Diphenylphenol homopolymer, sru 25035-37-4,
p-Phenylenediamine-terephthalic acid copolymer 25134-01-4,
2,6-Dimethylphenol homopolymer 26101-52-0, Polyvinyl sulfonic acid
26353-84-4, 2,6-Diphenylphenol homopolymer 27754-99-0, Polyvinyl
phosphonic acid 50851-57-5, Polystyrene sulfonic acid
264624-35-3, Trifluorostyrenesulfonic acid homopolymer
(composite solid polymer electrolyte membranes)

L63 ANSWER 18 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
2000:32556 Document No. 132:86775 High durability solid polymer
electrolyte. Taniguchi, Takumi; Kawakado, Masaya; Morimoto, Tomo
(Toyota Central Research and Development Laboratories, Inc., Japan).
Jpn. Kokai Tokkyo Koho JP 2000011756 A2 20000114, 8 pp.
(Japanese). CODEN: JKXXAF. APPLICATION: JP 1998-174352 19980622.

AB The electrolyte has a mixt. of a polymer having electrolytic groups
and hydrocarbon parts and a P-contg. compd. The electrolyte shows
high durability and excellent resistance to oxidn.

IC ICM H01B001-12
ICS C08L101-02; H01M008-02
CC 76-10 (Electric Phenomena)
Section cross-reference(s): 38

IT Polyketones
Polyketones
Polysulfones, uses
Polysulfones, uses
(polyether-, phosphonated; solid polymer
electrolyte contg. P-contg. compd.)
IT Polyethers, uses
Polyethers, uses
(polysulfone-, phosphonated; solid polymer
electrolyte contg. P-contg. compd.)

L63 ANSWER 19 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1999:107066 Document No. 130:169310 Manufacture of polyethersulfone
films with good yellowing prevention. Kanemitsu, Akiyoshi (Sumitomo
Chemical Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 11035705 A2
19990209 Heisei, 3 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP
1997-199941 19970725.

AB Title films, useful for optical films, are manufd. by casting

polyethersulfones (PES) solns. contg. hypophosphonic acid and/or phosphonic acid on substrates, drying the solns. to form films, and peeling the films off the substrates. Thus, a Cl₂CH₂ soln. contg. PES composed of 82.4 mol% C₆H₄SO₂C₆H₄O and 17.6 mol% C₆H₄SO₂C₆H₄OC₆H₄C₆H₄O and 100 ppm (on PES) hypophosphonic acid was cast on glass and dried to give a film showing total light transmittance 89.7%, haze 0.4%, and yellowness index 0.92.

IC ICM C08J005-18
ICS B29C041-12; B29C041-24; C08K003-32; C08L081-06; B29K071-00;
B29L007-00

CC 38-3 (Plastics Fabrication and Uses)

IT Polysulfones, uses

Polysulfones, uses

(polyether-; manuf. of polyethersulfone films contg. hypophosphonic acid and/or phosphonic acid for yellowing prevention)

IT Polyethers, uses

Polyethers, uses

(polysulfone-; manuf. of polyethersulfone films contg. hypophosphonic acid and/or phosphonic acid for yellowing prevention)

L63 ANSWER 20 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN

1999:64727 Document No. 130:112338 **Membrane** and method for synthesis of hydrogen peroxide. McIntyre, James A.; Sanders, Edgar S., Jr.; Mahoney, Robert D.; Webb, Steven P.; Murchison, Craig B.; Hayes, David A. (The Dow Chemical Company, USA). PCT Int. Appl. WO 9902264 A1 19990121, 37 pp. DESIGNATED STATES: W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 1998-US12156 19980610. PRIORITY: US 1997-52299 19970711.

AB A **membrane** useful for the manuf. of hydrogen peroxide from hydrogen and oxygen has a hydrogen contact side and an oxygen contact side and comprises a porous hydrophobic catalyst layer facing the oxygen contact side and a gas flux control layer facing the hydrogen contact side. A gas flux control layer is positioned between the hydrogen contact side and the porous hydrophobic catalyst layer such that the flux of hydrogen may be controllably delivered to the porous hydrophobic catalyst layer. The gas flux control layer is typically a macroporous hydrophobic org. polymeric material selected from polycarbonates, polyesters, polyester carbonates, polysulfones, polyolefins, polyphenylene oxides, polyethers, polyimides, polystyrene, polyether imides, polyamide imides, or polyether sulfones. In addn., a catalyst erosion control layer is positioned on the surface of the porous hydrophobic catalyst layer. The catalyst is an oxygen-reducing catalyst selected from Pt, Pd, Rh, Re, In, Au, Ag, Cu, Co, Fe, Ni, Pb, Zn,

Ga, Sn, and Bi, on a carrier. The **membrane** and method may be used to synthesize hydrogen peroxide directly from hydrogen and oxygen without the use of org. solvents or complex equipment for ionic and elec. transport.

- IC ICM B01J035-06
- ICS B01J031-06; C01B015-029
- CC 49-8 (Industrial Inorganic Chemicals)
- Section cross-reference(s): 38
- ST hydrogen peroxide manuf catalyst **membrane**; oxygen reducing catalyst **membrane** hydrogen peroxide; polycarbonate **membrane** hydrogen peroxide manuf; hydrophobization **membrane** hydrogen peroxide manuf
- IT Copying paper
(carbon paper, porous; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Heteropoly acids
Zeolites (synthetic), uses
(catalyst support; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Fluoropolymers, uses
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Polycarbonates, uses
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Polyesters, uses
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Polyethers, uses
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Polyimides, uses
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Polyolefins
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Polyoxyphenylenes
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Polysulfones, uses
(gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from

- hydrogen and oxygen)
- IT **Membranes**, nonbiological
(hydrophobic; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Fluoropolymers, reactions
(hydrophobization agent; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Silanes
(hydrophobization agents; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Hydrophobicity
(hydrophobization; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Catalysts
(**membrane**; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Fluorides, reactions
(org., hydrophobization agent; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT **Membranes**, nonbiological
(permselective; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Polyimides, uses
Polyimides, uses
(polyamide-, gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Polyesters, uses
Polyesters, uses
(polycarbonate-, gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Polycarbonates, uses
Polycarbonates, uses
(polyester-, gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Polyimides, uses
Polyimides, uses
Polysulfones, uses
Polysulfones, uses
(polyether-, gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Polyamides, uses

- Polyamides, uses
- Polyethers, uses
- Polyethers, uses
 - (polyimide-, gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT Ion exchangers
- Reduction catalysts
 - (polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT **Polyethers, uses**
 - Polyethers, uses**
 - (polysulfone-, gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT 1306-38-3, Cerium oxide, uses 1312-81-8, Lanthanum oxide 1314-23-4, Zirconia, uses 1344-28-1, Alumina, uses 7440-44-0, Carbon, uses 7631-86-9, Silica, uses 7664-38-2D, Phosphoric acid, alk. earth salts, uses 7664-93-9D, Sulfuric acid, alk. earth salts, uses 11129-18-3, Cerium oxide 12653-89-3, Vanadium silicate 13463-67-7, Titania, uses 42613-21-8, Titanium silicate (catalyst support; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT 7439-89-6, Iron, uses 7439-92-1, Lead, uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-15-5, Rhenium, uses 7440-16-6, Rhodium, uses 7440-22-4, Silver, uses 7440-31-5, Tin, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-55-3, Gallium, uses 7440-57-5, Gold, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses 7440-74-6, Indium, uses
 - (catalysts; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT 9002-88-4 9003-07-0 9010-79-1, Ethylene-propylene copolymer (gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT 9003-53-6 9003-70-7, Styrene-divinylbenzene copolymer (gas flux control layer; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT 1429-50-1, Ethylenediamine tetra(methylenephosphonic acid) 2466-09-3, Pyrophosphoric acid 2809-21-4, 1-Hydroxyethylidene-1,1-diphosphonic acid 6419-19-8, Aminotri(methylenephosphonic acid)
 - (hydrogen peroxide stabilizers; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT 7782-41-4, Fluorine, reactions 9002-84-0, PTFE
 - (hydrophobization agent; polymeric **membrane** with impregnated catalyst for manuf. of hydrogen peroxide from

- hydrogen and oxygen)
- IT 27815-51-6, Tetrabromobisphenol A polycarbonate
(**membrane**; polymeric **membrane** with
impregnated catalyst for manuf. of hydrogen peroxide from
hydrogen and oxygen)
- IT 7722-84-1P, Hydrogen peroxide (H₂O₂), preparation
(polymeric **membrane** with impregnated catalyst for
manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT 1333-74-0, Hydrogen, reactions 7782-44-7, Oxygen, reactions
(polymeric **membrane** with impregnated catalyst for
manuf. of hydrogen peroxide from hydrogen and oxygen)
- IT 64-18-6, Formic acid, uses 64-19-7, Acetic acid, uses 74-90-8,
Hydrogen cyanide, uses 144-62-7, Ethanedioic acid, uses
7647-01-0, Hydrochloric acid, uses 7664-38-2, Phosphoric acid,
uses 7664-93-9, Sulfuric acid, uses 7697-37-2, Nitric acid, uses
10034-85-2, Hydrogen iodide 10035-10-6, Hydrogen bromide, uses
(promoter; polymeric **membrane** with impregnated catalyst
for manuf. of hydrogen peroxide from hydrogen and oxygen)
- L63 ANSWER 21 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1996:545590 Document No. 125:196767 Manufacture of organophosphorus
oligomers as fireproofing agents for fibers. Kubota, Michio; Kondo,
Yoshikazu; Saito, Hajime; Makino, Kimihiro (Kanebo Ltd, Japan; Nikka
Chemical Ind Co Ltd). Jpn. Kokai Tokkyo Koho JP 08151392 A2
19960611 Heisei, 11 pp. (Japanese). CODEN: JKKXAF. APPLICATION:
JP 1995-61669 19950224. PRIORITY: JP 1994-261556 19940930.
- AB Title oligomers with acid value <10 are manufd. by condensation of
XP(:O)L₂ (X = C1-8 alkyl, C6-18 aryl; C7-20 aralkyl, C6-14 satd.
alicyclic; L = halo) with H(OCH₂CH₂)LOAO(CH₂CHRO)mH (A =
halogen-free divalent arom. group; R = H, C1-4 alkyl; l, m = 1, 2),
followed by hydrolysis and addn. of the resulting oligomeric
HO[P(:O)(X)(OCH₂CH₂)LOAO(CH₂CHRO)m]nH (A, R, X, l, m = same as
above) with epoxy compds. The oligomers do not discolor fibers, do
not generate toxic gas when burned, and show good dyeability. Thus,
condensation of Me₂C(C₆H₄OCH₂CH₂OH-4)₂ with PhPOCl₂, hydrolysis, and
addn. with 1,2-epoxybutane gave all-4-EtCH(OH)CH₂O[P(:O)(Ph)OCH₂CH₂O]
CMe₂OCH₂CH₂O]nH (mol. wt. 6000).
- IC ICM C07F009-38
ICS C08G079-04; D01F006-76; D01F006-84
- ICA C09K021-12
- CC 35-5 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 40
- IT **Polysulfones**, preparation
(**polyphosphonate-polyether**; manuf. of
fireproofing organophosphorus oligomers with low acid value for
fibers)
- L63 ANSWER 22 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1996:294808 Document No. 124:319377 Porous composite **membrane**
and process. Moya, Willson (Millipore Corporation, USA). PCT Int.
Appl. WO 9603202 A1 19960208, 23 pp. DESIGNATED STATES: W: CN, JP,
KR, RU; RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL,

PT, SE. (English). CODEN: PIXXD2. APPLICATION: WO 1995-US10080 19950725. PRIORITY: US 1994-281882 19940728.

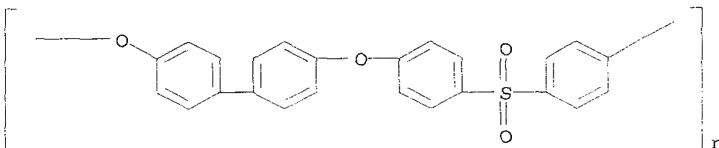
- AB The **membrane** comprises a porous **membrane** substrate having an av. pore size of 0.01-10 .mu. formed of a 1st polymer which is coated over its entire surface with a crosslinked 2nd polymer. The 2nd polymer is dissolved in a solvent with a free radical polymn. initiator in the absence of a crosslinking agent. The 2nd polymer is crosslinked in situ and rendered insol. by mild heating and/or exposure to UV light.
- IC ICM B01D069-12
- CC 38-3 (Plastics Fabrication and Uses)
- ST polyvinylidene fluoride porous composite **membrane**; polyethylene porous composite **membrane**; ultrafiltration hydrophilic composite **membrane**; polypropylene porous composite **membrane**; hollow fiber composite **membrane**
- IT **Membranes**
 (porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)
- IT Polyamides, uses
 Polypropene fibers, uses
 (porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)
- IT Fluoropolymers
 Polysulfones, uses
 (porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)
- IT Polyolefin fibers
 (ethylene, porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)
- IT Textiles
 (nonwoven, porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)
- IT **Polysulfones**, uses
 (polyether-, porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)
- IT **Polyethers**, uses
 (polysulfone-, porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)
- IT Alkenes, uses
 (.alpha.-, polymers, porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)
- IT 9002-84-0, Polytetrafluoroethylene 9002-88-4, Polyethylene 9002-89-5, Polyvinyl alcohol 9003-01-4, Polyacrylic acid 9003-07-0, Polypropylene 9003-39-8, Poly(vinyl pyrrolidone) 24937-79-9, Polyvinylidene fluoride 26336-38-9, Poly(vinyl amine) 27754-99-0, Poly(vinyl phosphonic acid) 29499-22-7, Vinyl alcohol-vinyl amine copolymer 51729-06-7, Diallyldimethylammonium chloride-vinyl alcohol copolymer (porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)

- IT 9002-86-2, PVC
(porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)
- IT 9003-05-8, Polyacrylamide 25087-26-7, Polymethacrylic acid
(porous composite **membrane** contg. substrate and surface with same configuration and manuf. process)

L63 ANSWER 23 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1996:35018 Document No. 124:147236 Process for producing azide-substituted aromatic polysulfones. Guiver, Michael D.; Robertson, Gilles P. (National Research Council of Canada, Can.). U.S. US 5475065 A 19951212, 30 pp. (English). CODEN: USXXAM. APPLICATION: US 1994-292959 19940822. PRIORITY: GB 1993-17617 19930824.

AB The title process involves attaching azide groups onto the arom. rings of polysulfones by first activating the attachment site by direct lithiation or **bromination**, followed by lithiation. The lithiated intermediates are converted substantially quant. to azides by reacting with a suitable azide, preferably tosyl azide, under substantially anhyd. conditions. Novel azide-substituted polysulfones contg. from one to about three azide groups per repeat polymer unit were obtained, the degree of azide substitution being detd. by the degree of lithiation. The azides may also be converted to other functional derivs. such as primary amines and crosslinked membranes.

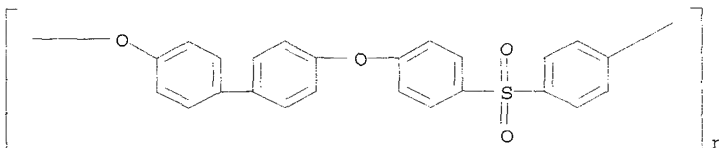
- IT 25839-81-ODP, Radel R5000, reaction products with azides
(process for producing azide-substituted arom. polysulfones)
- RN 25839-81-0 HCAPLUS
- CN Poly(oxy[1,1'-biphenyl]-4,4'-diyl-oxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



- IC ICM C08G075-23
ICS C08L081-06
- NCL 525535000
- CC 35-8 (Chemistry of Synthetic High Polymers)
- IT 110-65-6DP, 2-Butyne-1,4 diol, reaction products with polysulfone azides 142-45-ODP, Acetylene dicarboxylic acid, reaction products with polysulfone azides 762-42-5DP, Dimethyl acetylenedicarboxylate, reaction products with polysulfone azides 1066-54-2DP, Trimethylsilylacetylene, reaction products with polysulfone azides 25135-51-7DP, Udel P-3500, reaction products with azides 25839-81-ODP, Radel R5000, reaction products

with azides
(process for producing azide-substituted arom. polysulfones)

- L63 ANSWER 24 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1995:868143 Document No. 123:257736 Chemical Modification of
Polysulfones II: An Efficient Method for Introducing Primary Amine
Groups onto the Aromatic Chain. Guiver, Michael D.; Robertson,
Gilles P.; Foley, Stephen (Institute for Environmental Research and
Technology, National Research Council, Ottawa, ON, K1A 0R6, Can.).
Macromolecules, 28(23), 7612-21 (English) 1995. CODEN: MAMOBX.
ISSN: 0024-9297. Publisher: American Chemical Society.
- AB Three modification approaches to aminated polysulfones were
investigated: replacement of arom. bromine with nucleophilic NH₂;
amination by electrophilic NH₂; and amination of lithiated
polysulfones via azides and other electrophilic NH₂ synthons. The
former two approaches resulted in low levels of amination, or in
polymer degradn. For the latter approach using lithiated
polysulfones, we report an efficient alternative to the nitration-
redn. methodol. for introducing amine groups onto polysulfones and
polyaryl sulfones. Polysulfones activated either on the ortho
sulfone sites or on the ortho ether sites by direct lithiation or
bromination-lithiation, were converted to azides by
treatment with tosyl azide, and then reduced to amine derivs. with
sodium borohydride. This could be accomplished either by a two-step
procedure whereby the azide was isolated, or by a "one-pot"
modification. Near-quant. conversions and high levels of
functionalization were achieved for the overall process. Polymers
having an amine degree of substitution (DS) of 1.0, 2.0, and 2.75
are reported. Structures were confirmed by NMR and IR spectroscopy.
GPC, TGA, and Tg data are also reported. A nonquant. reaction of
diphenylphosphoryl azide as well as 4-acetamidobenzenesulfonyl azide
with lithiated polysulfones also gave aminated derivs.
- IT 25839-81-0DP, Radel R5000, aminated
(primary amine group introduction onto polysulfone arom. chain)
- RN 25839-81-0 HCAPLUS
- CN Poly(oxy[1,1'-biphenyl]-4,4'-diyl-1,4-phenylenesulfonyl-1,4-
phenylene) (9CI) (CA INDEX NAME)



- CC 35-8 (Chemistry of Synthetic High Polymers)
- IT 25135-51-7DP, Udel P3500, aminated 25154-01-2DP, Bisphenol
A-4,4'-dichlorodiphenyl sulfone copolymer, aminated 25608-64-4DP,
4,4'-Biphenol-4,4'-dichlorodiphenylsulfone copolymer, aminated

25839-81-ODP, Radel R5000, aminated
(primary amine group introduction onto polysulfone arom. chain)

L63 ANSWER 25 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN

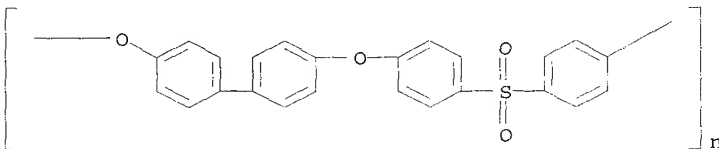
1995:283551 Document No. 122:161633 Chemical Modification of Polysulfones: A Facile Method of Preparing Azide Derivatives from Lithiated Polysulfone Intermediates. Guiver, Michael D.; Robertson, Gilles P. (Institute for Environmental Research and Technology, National Research Council of Canada, Ottawa, ON, K1A 0R6, Can.). Macromolecules, 28(1), 294-301 (English) 1995. CODEN: MAMOBX. ISSN: 0024-9297. Publisher: American Chemical Society.

AB A quant. and regiospecific method for attaching azide groups onto the arom. rings of polysulfone and poly(aryl sulfone) is reported. Polysulfones were activated either on the ortho-sulfone sites or the ortho-ether sites by direct lithiation or **bromination** -lithiation. The lithiated intermediates were converted quant. to azides by treatment with tosyl azide. Polysulfones contg. one, two, and three azide groups per repeat unit were obtained, the degree of substitution being detd. by the degree of lithiation. The structures were confirmed principally by NMR spectroscopy. TGA and GPC data are also reported. Sol. aryl azide modified polysulfones were readily isolated and are esp. useful for facile conversion to primary amines. This conversion as well as the 1,3-dipolar cycloaddns. of these azides will be reported sep.

IT 25839-81-ODP, Radel R5000, azide derivs.
(two-step prepn. and thermal stability of polyether-polysulfones)

RN 25839-81-0 HCAPLUS

CN Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



CC 35-8 (Chemistry of Synthetic High Polymers)

IT 941-55-9DP, Tosyl azide, reaction products with polyether-polysulfones 25135-51-7DP, Udel P 3500, azide derivs.

25839-81-ODP, Radel R5000, azide derivs.

(two-step prepn. and thermal stability of polyether-polysulfones)

L63 ANSWER 26 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN

1994:139153 Document No. 120:139153 Modified polysulfones as membrane electrolytes. Nolte, R.; Ledjeff, K.; Bauer, M.; Muelhaupt, R. (Fraunhofer-Inst. Sol. Energiesyst., Freiburg, 7800, Germany). BHR Group Conference Series Publication, 3(Effective Membrane Processes--New Perspectives), 381-5 (English) 1993. CODEN:

BGCSEL. ISSN: 1470-0557.

- AB Com. available polymers, esp. poly(arylene ether sulfones), which are not affected by O, hydrolysis, and temp. change were functionalized by sulfonation and tested as solid polymer electrolytes in electrolyzers and fuel cells.
To solve the swelling problem, the membrane was crosslinked during the casting process using 1,1'-carbonyldiimidazole for activation of sulfonic acid groups and a diamine for the crosslinking. Sulfonated poly(arylene ether sulfone) membranes combine good electrochem. properties of the perfluorinated materials with low cost and advanced processability. Since arom. sulfonation is a reversible reaction, and consequently the sulfonic acid groups are not stable at elevated temps., phosphonic acid groups were attached to the poly(arylene ether sulfone). Materials with phosphonic acid groups showed a significantly higher temp. stability compared to the sulfonated polymers.
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology) Section cross-reference(s): 38, 72
- ST polysulfone modified electrolyte membrane; fuel cell modified polysulfone electrolyte membrane; electrolysis cell modified polysulfone electrolyte membrane; polyarylene ether sulfone sulfonated electrolyte membrane
- IT Electric resistance
(of sulfonated poly(arylene ether sulfones), for electrolytes in fuel and electrolytic cells)
- IT Fuel-cell electrolytes
(poly(arylene ether sulfones) for, sulfonated or phosphorylated)
- IT Membranes
(sulfonated poly(arylene ether sulfones), as electrolytes for fuel and electrolytic cells)
- IT Amines, compounds
(di-, reaction products, with sulfonated poly(arylene ether sulfones), crosslinked electrolyte membranes, for fuel and electrolytic cells)
- IT Polysulfones, compounds
(polyether-, arom., phosphorylated, electrolyte membranes, for fuel cells and electrolytic cells)
- IT Polysulfones, compounds
(polyether-, arom., sulfonated, electrolyte membranes, for fuel cells and electrolytic cells)
- IT Polyethers, compounds
(polysulfone-, arom., phosphorylated, electrolyte membranes, for fuel cells and electrolytic cells)
- IT Polyethers, compounds
(polysulfone-, arom., sulfonated, electrolyte membranes, for fuel cells and electrolytic cells)
- IT Permeability and Permeation

- (selective, of sulfonated poly(arylene ether sulfones), for electrolytes in fuel and electrolytic cells)
- IT 25135-51-7D, Udel P-1700, phosphorylated 25667-42-9D, Victrex PES, sulfonated, crosslinked with diamines (electrolyte membranes, for fuel cells and electrolytic cells)
- IT 530-62-1, 1,1'-Carbonyldiimidazole (in sulfonated poly(arylene ether sulfone) crosslinking, for electrolytes in fuel and electrolytic cells)
- L63 ANSWER 27 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1993:255448 Document No. 118:255448 Synthesis of aromatic polyphosphonate: low temperature solution polycondensation of 4,4'-sulfonyldiphenol with phenoxy dichlorophosphate. Liaw, Der Jang; Shen, Wen Chang (Dep. Chem. Eng., Natl. Taiwan Inst. Technol., Taipei, 106, Taiwan). Polymer, 34(6), 1336-8 (English) 1993. CODEN: POLMAG. ISSN: 0032-3861.
- AB An arom. polyphosphonate is prepd. from the reaction of Ph dichlorophosphate (I) with 4,4'-sulfonyldiphenol (II) in a chlorinated hydrocarbon solvent under low-temp. conditions. The glass transition temp. (Tg) and melt temp. of the copolymer are 69.degree. and 133.degree., resp. The lower Tg value of the I-II copolymer compared to that of phenylphosphonic dichloride-I copolymer may be attributed to the flexible ether linkage. I-II copolymer starts to lose wt. at .apprx.300.degree. under air or N atm. The I-II copolymer has good flame retardancy, as indicated by high limiting O index of 47.0.
- CC 35-5 (Chemistry of Synthetic High Polymers)
- ST polyether polysulfone polyphosphonate arom; sulfonyldiphenol phenyl dichlorophosphate polymn; flame retardant arom polyphosphonate; glass temp arom polyphosphonate
- IT Polysulfones, preparation (polyether-, arom., polyphosphonate-, prepn. and glass temp. of flame-retardant)
- IT Polyethers, preparation (polysulfone-, arom., polyphosphonate-, prepn. and glass temp. of flame-retardant)
- L63 ANSWER 28 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1991:20605 Document No. 114:20605 Process and apparatus for removing ammonia from mammalian cell cultures. Van Eikeren, Paul; Radovich, John M. (Bend Research, Inc., USA). Eur. Pat. Appl. EP 385613 A1 19900905, 8 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, FR, GB, IT, LI, NL, SE. (English). CODEN: EPXXDW. APPLICATION: EP 1990-301630 19900215. PRIORITY: US 1989-315477 19890224.
- AB A process for removing NH3 formed during the culturing of mammalian cells in a culture medium comprises: (a) contacting the culture medium with 1 side of a 2-sided, supported-fluid membrane wherein the membrane support is a microporous hydrophobic polymeric matrix; and (b) maintaining a strip soln. which has a pH .ltoreq. 7.0 with the other side of the supported-fluid

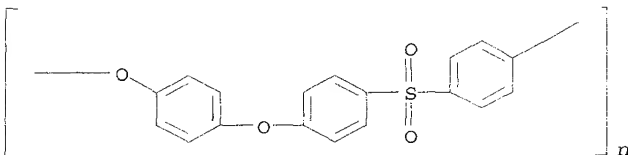
membrane. The **membrane** support matrix is hollow fibers (e.g. of polypropylene, polytetrafluoroethylene, polyethersulfone, etc.), beads, or NH₃-absorbing material (e.g. cation exchange resin or H⁺-contg. porous ceramic) coated on beads. A culture medium for baby hamster kidney (BHK) cells was circulated through the lumens of a supported-gas (air) **membrane** in a support contg. Celgard X-20 (polypropylene) hollow fibers potted in a bundle in a module. The shell of the module was filled with 0.5 M H₂SO₄ (pH 0.3). After 4.5 h the NH₃ concn. was reduced from 14 mM to 0.5 mM. The **membrane** removed inhibitory NH₃ but did not remove necessary nutrients or metabolites, as cell growth in the treated medium was essentially the same as that of the NH₃-free medium. Schematics of the app. are shown.

- IC ICM C12M003-00
- ICS B01D061-00
- CC 9-1 (Biochemical Methods)
- ST ammonia removal cell culture medium; hydrophobic polymer microporous **membrane** ammonia removal
- IT Alcohols, biological studies
- Amines, biological studies
- Carboxylic acids, biological studies
- (ammonia removal from mammalian cell culture medium by app. contg. supported-fluid hydrophobic **membrane** and strip soln. contg.)
- IT Animal tissue culture
- (ammonia removal from medium for, by supported-fluid **membrane** in app.)
- IT Cation exchangers
- (hydrophobic **membrane**-coated, ammonia removal from mammalian cell culture medium by circulation through)
- IT Polypropylene fibers, biological studies
- (microporous hollow fiber **membrane** contg., for ammonia removal from medium for mammalian cell culture)
- IT Sulfonic acids, biological studies
- (alkane, ammonia removal from mammalian cell culture medium by app. contg. supported-fluid hydrophobic **membrane** and strip soln. contg.)
- IT Alcohols, biological studies
- (aralkyl, ammonia removal from mammalian cell culture medium by app. contg. supported-fluid hydrophobic **membrane** and strip soln. contg.)
- IT Sulfonic acids, biological studies
- (arene, ammonia removal from mammalian cell culture medium by app. contg. supported-fluid hydrophobic **membrane** and strip soln. contg.)
- IT Amines, biological studies
- Carboxylic acids, biological studies
- (aryl, ammonia removal from mammalian cell culture medium by app. contg. supported-fluid hydrophobic **membrane** and strip soln. contg.)
- IT **Membranes**
- (hydrophobic, microporous, polymeric, for ammonia removal from

- medium for mammalian cell culture)
- IT **Membranes**
(hydrophobic, microporous, hollow-fiber, for ammonia removal from medium for mammalian cell culture)
- IT Filters and Filtration apparatus
(membranes, supported-fluid, ammonia removal from mammalian cell culture medium by circulation through)
- IT **Polysulfones**, biological studies
(polyether-, fiber, microporous hollow fiber membrane contg., for ammonia removal from medium for mammalian cell culture)
- IT Synthetic fibers, polymeric
(polyether-polysulfones, microporous hollow fiber membrane contg., for ammonia removal from medium for mammalian cell culture)
- IT **Polyethers**, biological studies
(polysulfone-, fiber, microporous hollow fiber membrane contg., for ammonia removal from medium for mammalian cell culture)
- IT Synthetic fibers, polymeric
(tetrafluoroethylene, microporous hollow fiber membrane contg., for ammonia removal from medium for mammalian cell culture)
- IT Synthetic fibers, polymeric
(vinylidene fluoride, microporous hollow fiber membrane contg., for ammonia removal from medium for mammalian cell culture)
- IT 7664-38-2D, Phosphoric acid, dialkyl esters 13598-36-2D, **Phosphonic acid**, alkyl, dialkyl 13840-40-9D, Phosphine oxide, trialkyl derivs.
(ammonia removal from mammalian cell culture medium by app. contg. supported-fluid hydrophobic **membrane** and strip soln. contg.)
- IT 9002-84-0, Polytetrafluoroethylene 24937-79-9, Poly(vinylidene fluoride)
(microporous hollow fiber **membrane** contg., for ammonia removal from medium for mammalian cell culture)
- IT 78-50-2, Trioctylphosphine oxide
(poly(vinylidene fluoride) **membrane**-coated Amberlite IRA-118H beads contg., in ammonia removal from baby hamster kidney cell culture medium)
- IT 120918-97-0, Amberlite IRA-118H
(poly(vinylidene fluoride) **membrane**-coated and trioctylphosphine oxide-contg., in ammonia removal from baby hamster kidney cell culture medium)
- IT 7664-41-7, Ammonia, uses and miscellaneous
(removal of, from medium for mammalian cell culture, by supported-fluid **membrane** in app.)

Soda Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 01020237 A2 19890124 Heisei, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1987-174959 19870715.

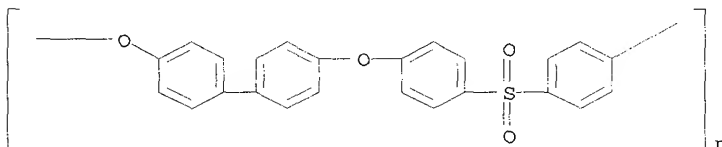
- AB Cation exchangers are prepd. from haloalkyl-contg. arom. condensation polymers, not having imide, amide, or ester groups, which are modified with cation-exchanging groups. A 10% ethylene dichloride soln. (1000 parts) of a polymer having p-OC6H4-p-O-C6H4-p-SO2C6H4 repeating units was treated with 50 parts ClCH2OMe (I) and 18 parts SnCl4 (II), then the resulted elastic polymer was treated with 3 equiv. HSO3Cl, and then a N-methylpyrrolidone soln. of the modified polymer was cast on a glass plate, treated in the air for 10 min, soaked in H2O, and peeled off to give a film, which was conditioned with aq. NaOH and aq. HCl to give a cation exchanger film having break strength 2 kg/cm2 vs. 0.5 for a control film prepd. without treatment by I and II.
- IT 28212-68-2D, haloalkyl-modified, sulfonated or **phosphonated** or carboxylated (cation exchanger films, with improved strength)
- RN 28212-68-2 HCAPLUS
- CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



- IC ICM C08J005-20
- CC 38-3 (Plastics Fabrication and Uses)
- IT 107-30-2D, Chloromethyl methyl ether, reaction products with sulfonated arom. polymers 623-03-0D, reaction products with haloalkyl-modified arom. polymers 7446-11-9D, Sulfur trioxide, reaction products with haloalkyl-modified arom. polymers 7719-12-2D, Phosphorous trichloride, reaction products with haloalkyl-modified arom. polymers 7790-94-5D, Chlorosulfonic acid, reaction products with haloalkyl-modified arom. polymers 25135-51-7D, haloalkyl-modified, sulfonated or **phosphonated** or carboxylated 25667-40-7D, Poly(p-phenylene oxide), haloalkyl-modified, sulfonated or **phosphonated** or carboxylated 28212-68-2D, haloalkyl-modified, sulfonated or **phosphonated** or carboxylated (cation exchanger films, with improved strength)

bromination-metalation. Guiver, Michael D.; Kutowy, O.; ApSimon, John W. (Div. Chem., Nat. Res. Counc. Canada, Ottawa, ON, K1A 0R6, Can.). Polymer, 30(6), 1137-42 (English) 1989. CODEN: POLMAG. ISSN: 0032-3861.

- AB A variety of functional groups can be substituted on arom. polysulfones by a process of **bromination** followed by metalation. Both Udel polysulfone and Radel poly(Ph sulfone) were **brominated** at room temp. using Br without a catalyst. Repeat units contg. Br atoms at the electrophilic site in the bisphenol portion were obtained when excess reagent was used. These polymers readily undergo metal-halogen exchange with n-BuLi. The resulting polyanionic lithiated polysulfones are reactive to a variety of electrophiles and give contg. functional groups such as carboxyl and hydroxyl. These polymers are useful as membrane materials.
- IT 25839-81-ODP, Radel, functionalized
(prepn. of, via **bromination-lithiation** followed by reaction with electrophiles)
- RN 25839-81-0 HCAPLUS
- CN Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



- CC 35-8 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 38
- ST functionalized arom polysulfone **bromination lithiation**
- IT **Bromination catalysts**
(iron, for arom. polysulfones)
- IT **Bromination**
(of arom. polysulfones, followed by lithiation and reaction with electrophiles)
- IT **Lithiation**
(of **brominated** arom. polysulfones, followed by reaction with electrophiles)
- IT Chains, chemical
(structure of, of functionalized arom. polysulfones prepd. via **bromination-lithiation** followed by reaction with electrophiles)
- IT Polysulfones, reactions
(arom., functionalization of, via **bromination**
-lithiation followed by reaction with electrophiles)
- IT 7726-95-6
(**bromination**, of arom. polysulfones, followed by

- lithiation and reaction with electrophiles)
- IT 7439-89-6, Iron, uses and miscellaneous
(catalysts, for **bromination** of arom. polysulfones)
- IT 25135-51-7, Udel P 3500 25839-81-0, Radel
(functionalization of, via **bromination**-lithiation
followed by reaction with electrophiles)
- IT 74-88-4DP, Iodomethane, reaction products with lithiated arom.
polysulfones 75-77-4DP, Chlorotrimethylsilane, reaction products
with lithiated arom. polysulfones 109-72-8DP, n-Butyllithium,
reaction products with **brominated** arom. polysulfones
119-61-9DP, Benzophenone, reaction products with lithiated arom.
polysulfones 124-38-9DP, Carbon dioxide, reaction products with
lithiated arom. polysulfones 624-92-0DP, Dimethyl disulfide,
reaction products with lithiated arom. polysulfones
(prepn. and structure of)
- IT 25135-51-7DP, Udel P 3500, functionalized 25839-81-0DP,
Radel, functionalized
(prepn. of, via **bromination**-lithiation followed by
reaction with electrophiles)
- L63 ANSWER 31 OF 31 HCAPLUS COPYRIGHT 2003 ACS on STN
1988:22763 Document No. 108:22763 Synthesis and study of
deformation-strength properties of some phosphorus-containing block
copolymers. Shaov, A. Kh.; Gurdaliev, Kh. Kh.; Keshtov, M. M.
(USSR). Polikondensats. Protsessy i Polimery, Nal'chik 122-30
From: Ref. Zh., Khim. 1987, Abstr. No. 9S669 (Russian) 1986.
- AB Title only translated.
- CC 37-6 (Plastics Manufacture and Processing)
- IT Fireproofing
(of arom. polyester-polyether-polysulfones,
with **cyclohexylphosphonic** dichloride)
- IT **Polysulfones**, properties
(polyester-polyether-, arom., block,
cyclohexylphosphonic dichloride-modified, fire resistance
and mech. properties of)
- IT **Polyethers**, properties
(polyester-polysulfone-, arom., block,
cyclohexylphosphonic dichloride-modified, fire resistance
and mech. properties of)
- IT Polyesters, properties
(polyether-polysulfone-, arom., block,
cyclohexylphosphonic dichloride-modified, fire resistance
and mech. properties of)
- IT 1005-22-7, **Cyclohexylphosphonic** dichloride
(modifier, for arom. polyester-polyether-
polysulfones, mech. properties and fire resistance in
relation to)

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L64 ANSWER 1 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN

2003:49087 Document No. 138:392561 Photo-physical and lasing characterization of neat films of 4-methyl-TPD and of an alternating copolymer of 4-methyl-TPD with MEH-PPV. Philip, R.; Holzer, W.; Penzkofer, A.; Tillmann, H.; Horhold, H.-H. (Institut II--Experimentelle und Angewandte Physik, Universitat Regensburg, Regensburg, D-93040, Germany). Synthetic Metals, 132(3), 297-308 (English) 2003. CODEN: SYMEDZ. ISSN: 0379-6779. Publisher: Elsevier Science B.V..

AB Wave-guided traveling wave lasing, i.e. amplification of spontaneous emission in a waveguide, was studied on neat films of the triphenylamine dimer 4-methyl-TPD (N,N'-bis(4-methylphenyl)-N,N'-diphenyl-benzidine) and an alternating copolymer with MEH-PPV assigned as TPD(4M)-MEH-P-PPV. The soln. processable polymer was prepd. via the polycondensation route. Laser action is achieved by transversally pumping neat films on glass substrates with picosecond excitation pulses (wavelength 347.15 nm, duration 35 ps). Lasing occurs around 422 nm for 4-methyl-TPD and around 544 nm for TPD(4M)-MEH-P-PPV. Below laser threshold leaky mode emission into the substrate along the film/surface interface is reported for 4-methyl-TPD. The optical consts. (absorption spectra and refractive index spectra), the absorption cross-section spectra, fluorescence quantum distributions, fluorescence quantum yields, and fluorescence lifetimes of the samples are detd. for photo-phys. characterization. The laser performance and the photo-phys. parameters of 4-methyl-TPD are compared with the mol. 3-methyl-TPD and the nonconjugated polymer poly-TPD(4M)-DPX which is built up of 4-methyl-TPD and .alpha.,.alpha.'-diphenylxylylene units. The parameters of TPD(4M)-MEH-P-PPV are compared with the parameters of TPD(4M)-MEH-PPV another alternating copolymer of 4-methyl-TPD with MEH-PPV. The synthesis details for TPD(4M)-MEH-PPV and TPD(4M)-MEH-P-PPV are given.

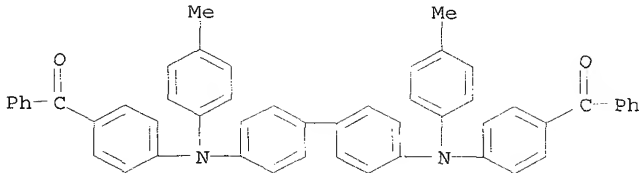
IT 525588-70-9P
(actual monomers; photo-phys. and lasing characterization of neat films of 4-Me-TPD and of an alternating copolymer of 4-Me-TPD with MEH-PPV)

RN 525588-70-9 HCAPLUS
CN Phosphonic acid, [[2-[(2-ethylhexyl)oxy]-5-methoxy-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with [[1,1'-biphenyl]-4,4'-diylbis[[[(4-methylphenyl)imino]-4,1-phenylene]bis[phenylmethanone] (9CI) (CA INDEX NAME)

CM 1

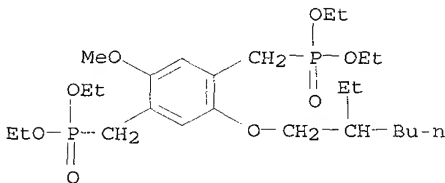
CRN 525588-69-6

CMF C52 H40 N2 O2



CM 2

CRN 181307-48-2
CMF C25 H46 O8 P2



CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 36

IT 391257-49-1P 525588-70-9P

(actual monomers; photo-phys. and lasing characterization of neat films of 4-Me-TPD and of an alternating copolymer of 4-Me-TPD with MEH-PPV)

L64 ANSWER 2 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
2002:299601 Document No. 137:176650 MEH-PPV and thianthrene-containing PPV-derivatives as efficient polymeric materials for solid-state lasers. Hoerhold, Hans-Heinrich; Tillmann, Hartwig; Bader, Cornelia; Klemm, Elisabeth; Holzer, Wolfgang; Penzkofer, Alfons (Innovent Technologieentwicklung e.V., Jena, 07745, Germany). Proceedings of SPIE-The International Society for Optical Engineering, 4464(Organic Light-Emitting Materials and Devices V), 317-328 (English) 2002. CODEN: PSISDG. ISSN: 0277-786X. Publisher: SPIE-The International Society for Optical Engineering.
AB Using the methodol. of traveling-wave lasing in neat films (amplified spontaneous emission, ASE) the authors have studied the novel polycondensation-type MEH-PPV 1(strictly linear and fully conjugated) and some of its alternating copolymer combinations with

2,5-dialkoxy-phenylenevinylene (2-5) and thianthrene-vinylene (6-8) units. Well-defined, soln.- processable, high-mol. wt. samples ($M_w = 20.000 - 60.000$) were prepd. via the polycondensation route employing the repetitive HORNER carbonyl-olefination. This is based on the reaction of appropriate xylylene bis(phosphonates) with dialkoxy-substituted phenylene dialdehydes and dibenzoyl-thianthrene (dibenzoyl-benzene), resp. In previous studies Thianthrene-PPVs are reported to display green EL from single layer devices while the dialkoxy-PPVs are known to display orange or red EL. Here, traveling-wave lasing studies were performed on neat films. Soln. cast amorphous film samples on glass substrates are transversally pumped with picosecond laser pulses (wavelength 347 nm, duration 35 ps). Lasing occurs at 622 nm for MEH-PPV 1, 646 nm (M3EH-PPV 2), 629 nm (MEH-DOO-PPV 3), 629 nm (DMO-DO18-PPV 4), 522 nm (Thianthrene-MEH-PPV 7) and at 647 nm and 630 nm for the new M3EH-OPV contg. terpolymers (DP-MEH-OPV)0,25n(M3EH-OPV)0,75n 5 and (Thianthrene-MEH-OPV)0,5n(M3EH-OPV)0,5n 8, resp. The spectral widths of emission are < 13 nm. Laser threshold energy densities are rather low, ranging between 4 and 18 μJcm^{-2} . The effective lengths of amplification are roughly 1 mm. These results show that all the condensation polymers under study are good solid-state laser materials for optically pumped disk, ring and DFB lasers and that they are potential candidates for elec. pumped lasers. Also, amorphous blends of the polycondensation-type MEH-PPV 1 with the electroactive DPOP-PPV (ratio 50:50, 30:70 p wt.) or Thianthrene-MEH-PPV 7 (ratio 50:50, 22:78 and 5.6:94.4 p wt.) exhibit red ASE around 590 - 615 nm as the result of energy (exciton) transfer from the green emitting donor materials to the MEH-PPV acceptors.

IT 176856-39-6P 446859-88-7P 446859-89-8P
446859-90-1P

(MEH-PPV and thianthrene-contg. PPV-derivs. as efficient polymeric materials for solid-state lasers)

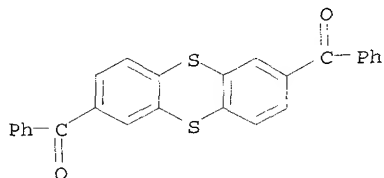
RN 176856-39-6 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 2,7-thianthrenediylbis[phenylmethanone] (9CI) (CA INDEX NAME)

CM 1

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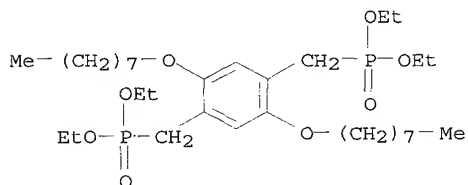
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CM 2

CRN 176856-31-8

CMF C32 H60 O8 P2



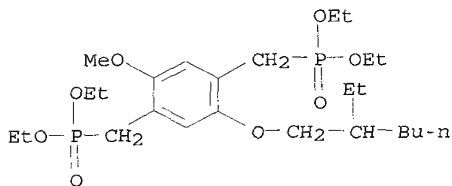
RN 446859-88-7 HCAPLUS

CN Phosphonic acid, [[2-[(2-ethylhexyl)oxy]-5-methoxy-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 2,5-dimethoxy-1,4-benzenedicarboxaldehyde and 1,4-phenylenebis[phenylmethanone] (9CI) (CA INDEX NAME)

CM 1

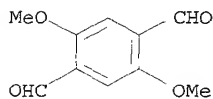
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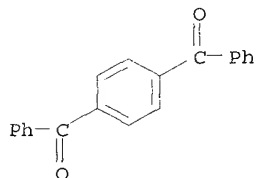
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CRN 7310-97-6
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CM 3

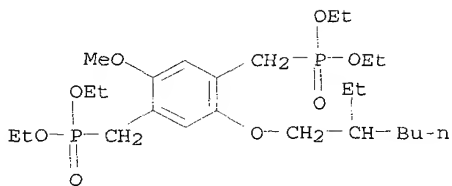
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CMF C20 H14 O2



RN 446859-89-8 HCAPLUS
CN Phosphonic acid, [[2-[(2-ethylhexyl)oxy]-5-methoxy-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 2,7-thianthrenediylbis[phenylmethanone] (9CI) (CA INDEX NAME)

CM 1

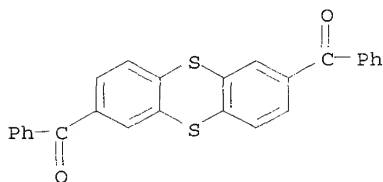
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CM 2

CRN 176856-38-5

CMF C26 H16 O2 S2



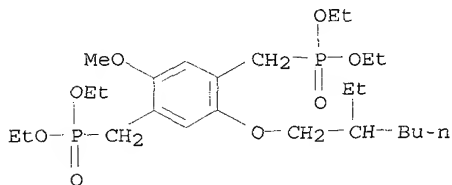
RN 446859-90-1 HCAPLUS

CN Phosphonic acid, [[2-[(2-ethylhexyl)oxy]-5-methoxy-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 2,5-dimethoxy-1,4-benzenedicarboxaldehyde and 2,7-thianthrenediylbis[phenylmethanone] (9CI) (CA INDEX NAME)

CM 1

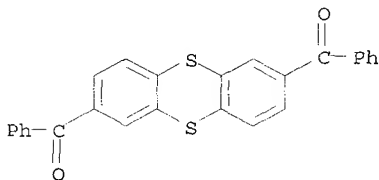
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CMF C25 H46 O8 P2



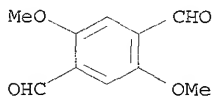
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CRN 176856-38-5
CMF C26 H16 O2 S2



CM 3

CRN 7310-97-6
CMF C10 H10 O4



CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 38

IT 138184-36-8P, MEH PPV 176856-39-6P 176856-40-9P
240816-75-5P 240816-76-6P 245749-91-1P, M3EH-PPV 350704-90-4P
350831-46-8P 446859-86-5P 446859-87-6P 446859-88-7P
446859-89-8P 446859-90-1P 446877-78-7P
(MEH-PPV and thianthrene-contg. PPV-derivs. as efficient
polymeric materials for solid-state lasers)

L64 ANSWER 3 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN

2002:279657 Document No. 137:12836 Corrugated neat thin-film
conjugated polymer distributed-feedback lasers. Holzer, W.;
Penzkofer, A.; Pertsch, T.; Danz, N.; Brauer, A.; Kley, E. B.;
Tillmann, H.; Bader, C.; Horhold, H.-H. (Institut II -
Experimentelle und Angewandte Physik, Universitat Regensburg,
Regensburg, 93053, Germany). Applied Physics B: Lasers and Optics,
74(4-5), 333-342 (English) 2002. CODEN: APBOEM. ISSN: 0946-2171.
Publisher: Springer-Verlag.

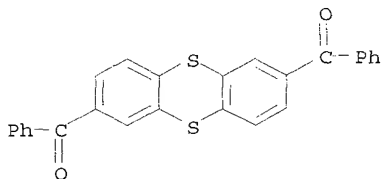
AB Wave-guided thin-film distributed-feedback (DFB) polymer lasers are fabricated by spin coating a PPV-derived semiconducting polymer, thianthrene-DOO-PPV, onto oxidized Si wafers with corrugated 2nd-order periodic gratings. The gratings are written by reactive ion beam etching. Laser action is achieved by transverse pumping with picosecond laser pulses (wavelength 347.15 nm, duration 35 ps). The DFB-laser surface emission and edge emission are analyzed. Outside the grating region the polymer film was used for comparative wave-guided traveling wave laser (amplified spontaneous emission (ASE)) studies. The pump pulse threshold energy d. for wave-guided DFB-laser action ($4-9 \mu\text{J cm}^{-2}$) is approx. a factor of two lower than the threshold for wave-guided traveling wave laser action. The spectral width of the DFB laser (down to $\Delta\lambda_{\text{DFB}} \approx 0.07 \text{ nm}$) is considerably narrower than that of the traveling wave laser ($\Delta\lambda_{\text{TWL}} \approx 14 \text{ nm}$). The DFB-laser emission is highly linearly polarized transverse to the grating axis (TE mode). Only at high pump pulse energy densities does an addnl. weak TM mode build up. The surface-emitted DFB-laser radiation has a low divergence along the grating direction. For both the DFB lasers and the traveling wave lasers, gain satn. occurs at high excitation energy densities.

IT 176856-39-6
(corrugated neat thin-film conjugated polymer distributed-feedback lasers)

RN 176856-39-6 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 2,7-thianthrenediylbis[phenylmethanone] (9CI) (CA INDEX NAME)

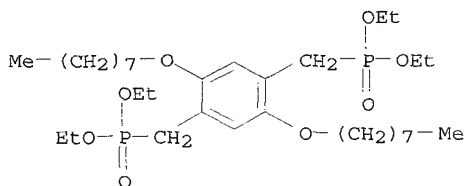
CM 1

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CMF C26 H16 O2 S2



CM 2

CRN 176856-31-8
CMF C32 H60 O8 P2



CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

IT 176856-39-6 176856-40-9
(corrugated neat thin-film conjugated polymer distributed-feedback lasers)

L64 ANSWER 4 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
2001:355788 Document No. 135:122843 Bulky side-group polymers - synthesis and characterization. Maier, Stefanie; Drury, Anna; Davey, Andrew P.; Byrne, Hugh J.; Blau, Werner (Materials Ireland Polymer Research Centre, Department of Physics, Trinity College Dublin, Dublin, Ire.). Synthetic Metals, 119(1-3), 85-86 (English) 2001. CODEN: SYMEDZ. ISSN: 0379-6779. Publisher: Elsevier Science S.A..

AB A series of conjugated polymers related to poly(phenylenevinylene) (PPV) was synthesized and characterized. These polymers contain phenylene moieties attached to the vinylene unit with various substitution patterns to obtain very complex systems. Some polymers only contain phenylene units along the polymer chain whereas for some of the derivs. naphthalene units were introduced into the backbone. Addnl., some derivs. were prepd. by varying para and meta substitution patterns. The influences of different structural alterations on the thermal behavior, the optical properties and electrochem. behavior are investigated. In general, the polymers are temp.-stable up to 350.degree., emit in the blue to green region of the visible spectrum and contain varying oxidn. and redn. potentials depending on the substitution pattern.

IT 241490-29-9P 241490-31-3P 241490-33-5P
350610-66-1P 350610-68-3P 350610-70-7P
350610-72-9P 350610-75-2P 350610-77-4P
350610-79-6P 350610-81-0P 350610-83-2P
350610-85-4P 350610-87-6P 350610-89-8P
350610-91-2P

(prepn. and characterization of conjugated poly(phenylenevinylene) derivs.)

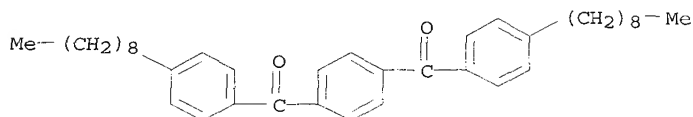
RN 241490-29-9 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,4-phenylenebis[(4-nonylphenyl)methanone] (9CI) (CA INDEX NAME)

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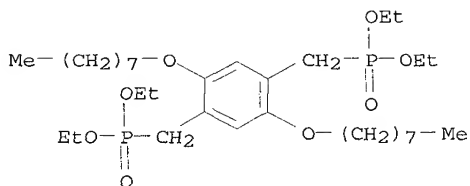
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CM 2

CRN 176856-31-8

CMF C32 H60 O8 P2



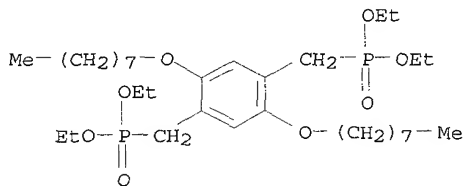
RN 241490-31-3 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,4-phenylenebis[(3,4-dimethoxyphenyl)methanone] (9CI) (CA INDEX NAME)

CM 1

CRN 176856-31-8

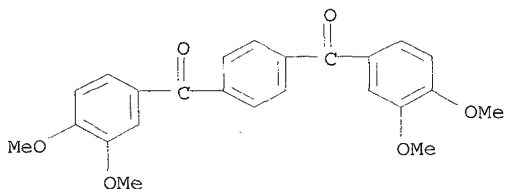
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CM 2

CRN 95560-64-8

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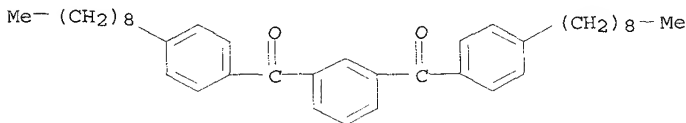
RN 241490-33-5 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[(4-nonylphenyl)methanone] (9CI) (CA INDEX NAME)

CM 1

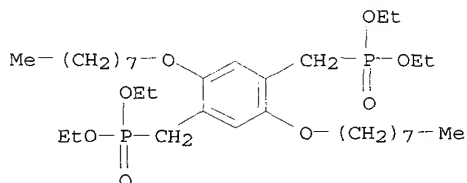
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CMF C38 H50 O2



CM 2

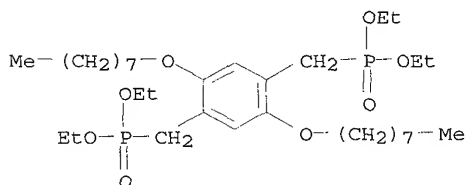
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CMF C32 H60 O8 P2



RN 350610-66-1 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,4-phenylenebis[(4-methoxyphenyl)methanone] (9CI) (CA INDEX NAME)

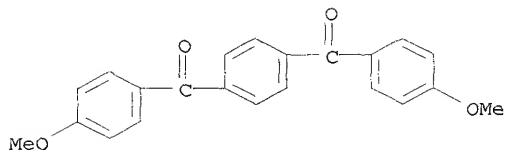
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CM 2

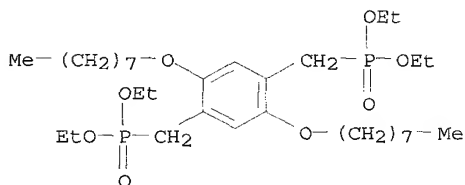
CRN 15517-45-0
CMF C22 H18 O4



RN 350610-68-3 HCAPLUS
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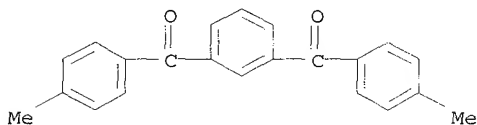
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CM 2

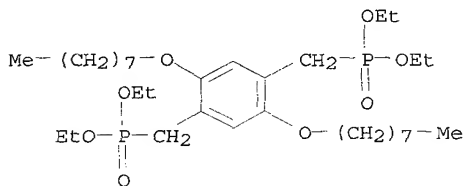
CRN 71400-25-4
 CMF C22 H18 O2



RN 350610-70-7 HCAPLUS
 CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[(4-methoxyphenyl)methanone] (9CI) (CA INDEX NAME)

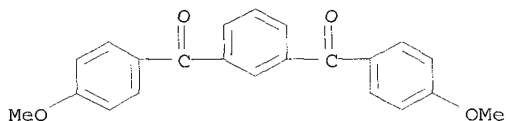
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CM 2

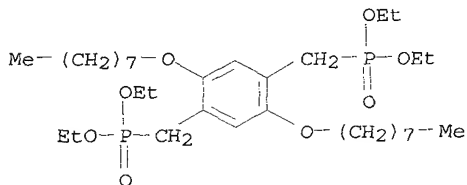
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RN 350610-72-9 HCAPLUS
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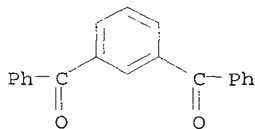
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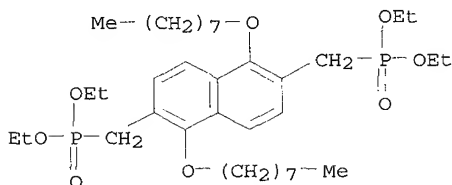
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RN 350610-75-2 HCAPLUS
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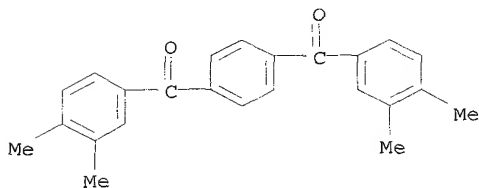
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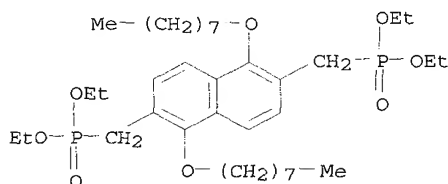
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RN 350610-77-4 HCAPLUS
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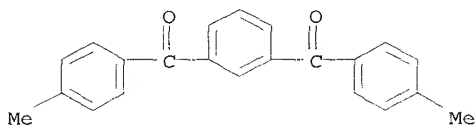
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CM 2

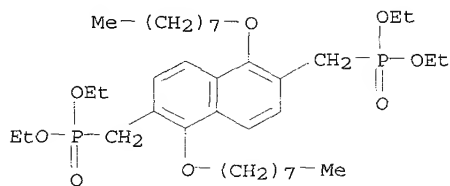
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RN 350610-79-6 HCAPLUS
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CM 1

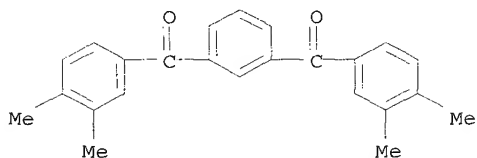
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CM 2

CRN 23602-89-3

CMF C24 H22 O2



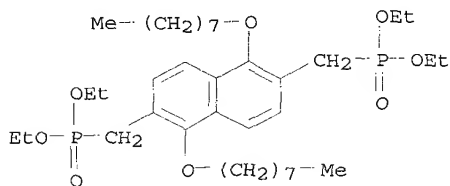
RN 350610-81-0 HCAPLUS

CN Phosphonic acid, [[1,5-bis(octyloxy)-2,6-naphthalenediyl]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[(3,4-dimethoxyphenyl)methanone] (9CI) (CA INDEX NAME)

CM 1

CRN 350610-74-1

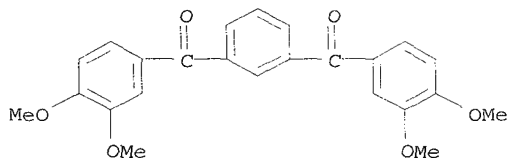
CMF C36 H62 O8 P2



CM 2

CRN 98274-43-2

CMF C24 H22 O6



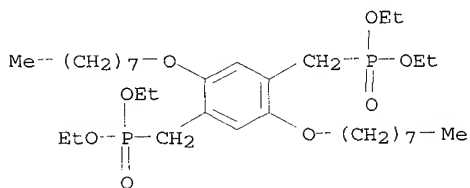
RN 350610-83-2 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,4-phenylenebis[(4-methylphenyl)methanone] (9CI) (CA INDEX NAME)

CM 1

CRN 176856-31-8

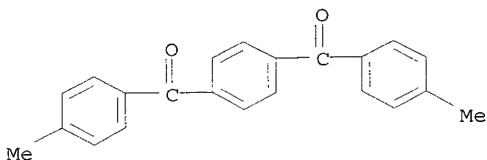
CMF C32 H60 O8 P2



CM 2

CRN 61565-13-7

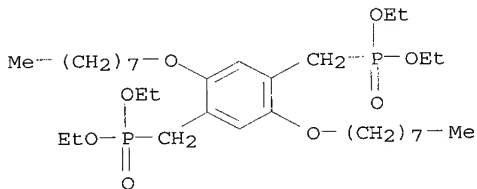
CMF C22 H18 O2



RN 350610-85-4 HCAPLUS
 CN Phosphonic acid, {[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,4-phenylenebis[(3,4-dimethylphenyl)methanone] (9CI) (CA INDEX NAME)

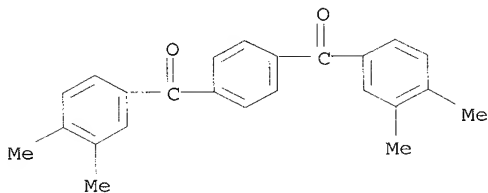
CM 1

CRN 176856-31-8
 CMF C32 H60 O8 P2



CM 2

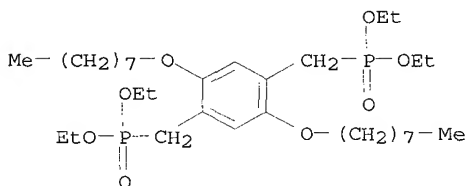
CRN 23602-87-1
 CMF C24 H22 O2



RN 350610-87-6 HCAPLUS
 CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[(3,4-dimethylphenyl)methanone] (9CI) (CA INDEX NAME)

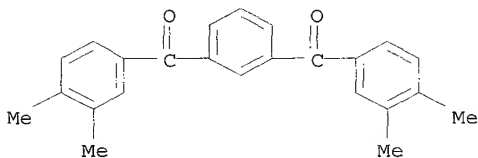
CM 1

CRN 176856-31-8
 CMF C32 H60 O8 P2



CM 2

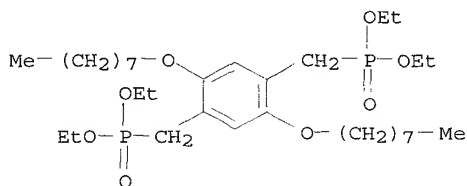
CRN 23602-89-3
 CMF C24 H22 O2



RN 350610-89-8 HCAPLUS
 CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[(3,4-dimethoxyphenyl)methanone] (9CI) (CA INDEX NAME)

CM 1

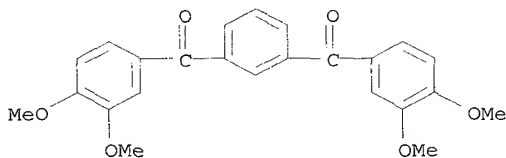
CRN 176856-31-8
 CMF C32 H60 O8 P2



CM 2

CRN 98274-43-2

CMF C24 H22 O6



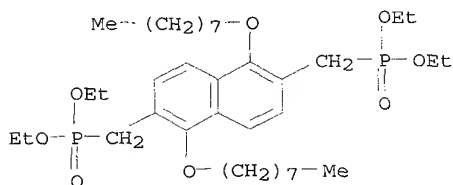
RN 350610-91-2 HCAPLUS

CN Phosphonic acid, [[1,5-bis(octyloxy)-2,6-naphthalenediyl]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[(4-methoxyphenyl)methanone] (9CI) (CA INDEX NAME)

CM 1

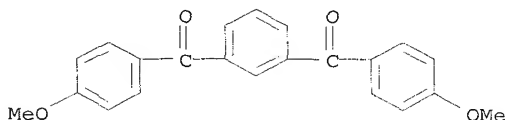
CRN 350610-74-1

CMF C36 H62 O8 P2



CM 2

CRN 7477-29-4
CMF C22 H18 O4



CC 35-5 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 36, 73, 76

IT 241490-29-9P 241490-30-2P 241490-31-3P
241490-32-4P 241490-33-5P 241490-34-6P
350610-66-1P 350610-67-2P 350610-68-3P
350610-69-4P 350610-70-7P 350610-71-8P
350610-72-9P 350610-73-0P 350610-75-2P
350610-76-3P 350610-77-4P 350610-78-5P
350610-79-6P 350610-80-9P 350610-81-0P
350610-82-1P 350610-83-2P 350610-84-3P
350610-85-4P 350610-86-5P 350610-87-6P
350610-88-7P 350610-89-8P 350610-90-1P
350610-91-2P 350610-92-3P

(prepn. and characterization of conjugated
poly(phenylenevinylene) derivs.)

L64 ANSWER 5 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN

1999:459142 Document No. 131:200150 Mono- and polycyclic aromatic
polymers - synthesis and properties. Maier, S.; Davey, A. P.;
Drury, A.; Byrne, H. J.; Blau, W. (Dep. Physics, Univ. Dublin,
Dublin, 2, Ire.). Synthetic Metals, 101(1-3), 31-32 (English) 1999.
CODEN: SYMEDZ. ISSN: 0379-6779. Publisher: Elsevier Science S.A..

AB A series of new mono- and polycyclic vinylene copolymers was
synthesized via polycondensation of substituted vinylphenols and
2,6-substituted and m-phenyl-substituted naphthalene monomers using
KOTBu as catalyst and toluene as solvent, under Ar. The polymers
obtained have color that varies from pale to very bright yellow, are
sol. in toluene, chloroform, and trichlorobenzene. The emission
max. of the naphthalene polymers is slightly blue-shifted vs. that
of poly(p-phenylene vinylene), as predicted by Hueckel calcns. of
the band gap. Substitution at the meta position causes a shift to
shorter wavelength vs. the para-substituted polymers, due to
interruption of the .pi.-conjugation.

IT 241490-24-4P 241490-29-9P 241490-31-3P
241490-33-5P

(prepn. of mono- and polycyclic arom. polyphenylenevinylenes and
substituent effects on band gap and conjugation length)

RN 241490-24-4 HCAPLUS

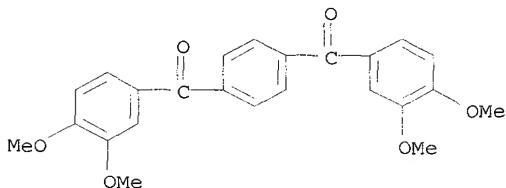
CN Phosphonic acid, [2,6-naphthalenediyl]bis(methylene)]bis-, tetraethyl

ester, polymer with 1,4-phenylenebis[(3,4-dimethoxyphenyl)methanone]
(9CI) (CA INDEX NAME)

CM 1

CRN 95560-64-8

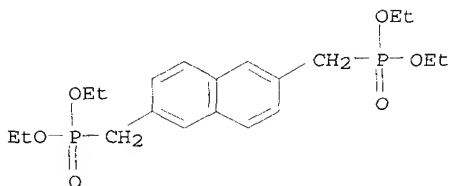
CMF C24 H22 O6



CM 2

CRN 23973-60-6

CMF C20 H30 O6 P2



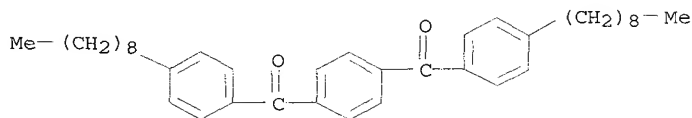
RN 241490-29-9 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,4-phenylenebis[(4-nonylphenyl)methanone] (9CI) (CA INDEX NAME)

CM 1

CRN 241490-21-1

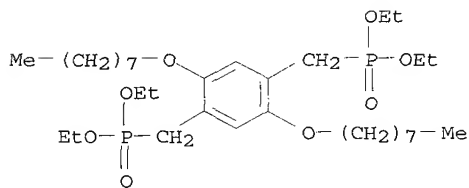
CMF C38 H50 O2



CM 2

CRN 176856-31-8

CMF C32 H60 O8 P2



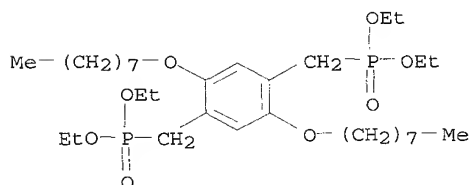
RN 241490-31-3 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,4-phenylenebis[(3,4-dimethoxyphenyl)methanone] (9CI) (CA INDEX NAME)

CM 1

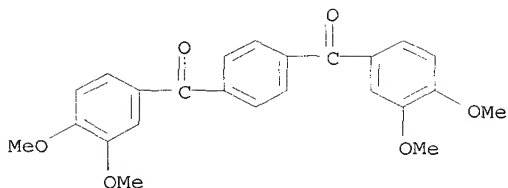
CRN 176856-31-8

CMF C32 H60 O8 P2



CM 2

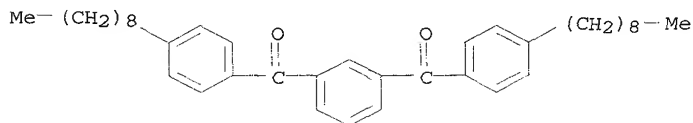
CRN 95560-64-8
CMF C24 H22 O6



RN 241490-33-5 HCAPLUS
CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 1,3-phenylenebis[(4-nonylphenyl)methanone] (9CI) (CA INDEX NAME)

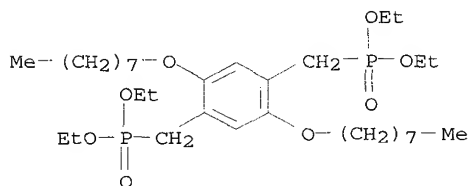
CM 1

CRN 241490-26-6
CMF C38 H50 O2



CM 2

CRN 176856-31-8
CMF C32 H60 O8 P2



CC 35-5 (Chemistry of Synthetic High Polymers)
 Section cross-reference(s): 36, 76

IT 241490-22-2P 241490-23-3P 241490-24-4P 241490-25-5P
 241490-27-7P 241490-28-8P 241490-29-9P 241490-30-2P
 241490-31-3P 241490-32-4P 241490-33-5P
 241490-34-6P
 (prepn. of mono- and polycyclic arom. polyphenylenevinylenes and
 substituent effects on band gap and conjugation length)

L64 ANSWER 6 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
 1998:321284 Document No. 129:16522 Ordered poly(arylenevinylene)
 terpolymers, their manufacture and use as electroluminescent
 materials. Kreuder, Willi; Hoerhold, Hans-Heinrich; Rost, Henning;
 Hartmann, Annett (Hoechst A.-G., Germany). Ger. Offen. DE 19646877
 A1 19980514, 18 pp. (German). CODEN: GWXXBX. APPLICATION: DE
 1996-19646877 19961113.

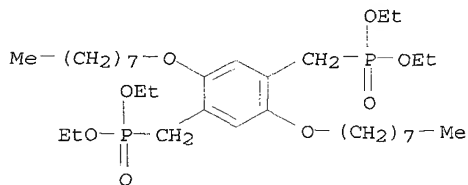
AB The polymers have the order (ABCB)_n, where A, B, and C are different
 arylenevinylene units :CR1XCR2: [R1, R2 = H, (un)substituted C1-22
 hydrocarbyl; X = (hetero)arylene] and can be used in
 electroluminescent displays and lighting elements. Thus, 0.005 mol
 2,5-dimethoxyterephthalaldehyde was condensed with 0.010 mol
 tetra-Et 2,5-bis(octyloxy)-p-xylylenediphosphonate in toluene at
 80.degree. in the presence of 0.01 mol tert-BuOK, and the product
 was polycondensed with 0.005 mol 4,4'-diformylbenzophenone by using
 another 0.01 mol tert-BuOK to give a polymer with Mn 4600, Mw
 14,100, Tg 41.degree., absorption .lambda.max 452 nm, emission
 .lambda.max 535 nm as a red powder in 46% yield.

IT 207733-43-5P 207733-70-8P
 (ordered poly(arylenevinylene) terpolymers as electroluminescent
 materials)

RN 207733-43-5 HCAPLUS
 CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-
 phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with
 4,4'-carbonylbis[benzaldehyde] and 2,5-dimethoxy-1,4-
 benzenedicarboxaldehyde (9CI) (CA INDEX NAME)

CM 1

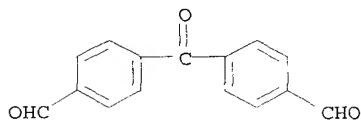
CRN 176856-31-8
 CMF C32 H60 O8 P2



CM 2

CRN 162896-87-9

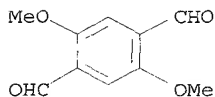
CMF C15 H10 O3



CM 3

CRN 7310-97-6

CMF C10 H10 O4



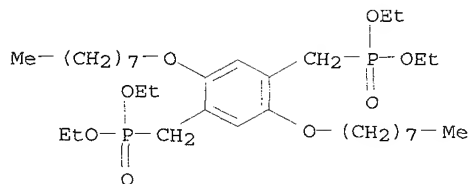
RN 207733-70-8 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylen]bis(methylene)]bis-, tetraethyl ester, polymer with 4,4'-carbonylbis[benzaldehyde] and 4,4'-(phenylimino)bis[benzaldehyde] (9CI) (CA INDEX NAME)

CM 1

CRN 176856-31-8

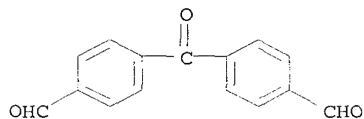
CMF C32 H60 O8 P2



CM 2

CRN 162896-87-9

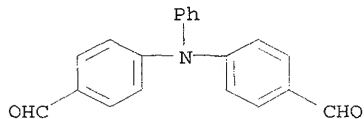
CMF C15 H10 O3



CM 3

CRN 53566-95-3

CMF C20 H15 N O2



IC ICM C08G061-00

ICS C09K011-06; H05B033-14; C07C015-50; C07C015-52; C07C001-32;
C07C047-575; C07C045-45

ICA C08G061-02; C08G061-12; C07C323-22; C07D333-06; C07D339-08

CC 35-5 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 38, 73

IT	207733-43-5P	207733-46-8P	207733-50-4P	207733-53-7P
	207733-56-0P	207733-60-6P	207733-62-8P	207733-64-0P
	207733-66-2P	207733-68-4P	207733-70-8P	207733-72-0P
	207733-78-6P	207733-80-0P	207733-85-5P	207733-86-6P

(ordered poly(arylenevinylene) terpolymers as electroluminescent materials)

L64 ANSWER 7 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN

1998:90649 Document No. 128:186034 Synthesis and electroluminescence of novel DSB-segmented copolymers of the PAV/PPV type. Horhold, Hans-Henrich; Rost, Henning; Teuschel, Annett; Kreuder, Willi; Spreitzer, Hubert (Institute Organic Chemistry Macromolecular Chemistry, University Jena, Jena, 07743, Germany). Proceedings of SPIE-The International Society for Optical Engineering, 3148(Organic Light-Emitting Materials and Devices), 139-150 (English) 1997. CODEN: PSISDG. ISSN: 0277-786X. Publisher: SPIE-The International Society for Optical Engineering.

AB In this paper recent advances in the development of a novel class of highly efficient DSB-segmented copolymers 1-5 are reported. $[-Y-C_6H_4-CH=CH-C_6H_2(OR)_2-CH=CH-C_6H_4-]_n$, 1 Y = NPh, 2 Y = O, 3 Y = CO, 4 Y = CHOH, $[-Y-C_6H_4-CH=CH-CR'-C_6H_4-CR'=CH-C_6H_4-]_n$, 5 Y = NPh, R' = $CH_3OC_6H_4$, where 1, 2, 3 have successfully been synthesized using the HORNER/WITTIG carbonyl olefination of appropriate dialdehydes which are based on triphenylamine, diphenylether, and diphenylketone. 4 Was prep'd. by polymer analogous carbonyl redn. of 3. This approach resulted in high mol. and sol. materials (Mn 10.000-20.000) exhibiting green (1, 3) and blue (2, 3) luminescence with an excellent photoluminescence efficiency (65-90% in soln.). Goal in this paper is to illustrate the changes in the electrooptical properties that were caused by segmentation of the polyconjugated PPV backbone into distyrylbenzene (SDB) segments which are connected by mono-at. Y groups. The chem. character of Y dets. significantly the oxidn. potentials (EOX = 0,66 V (1), 0,92 V (2), 1,15 V (3), 1,04 V (4), V vs. Ag/AgCl). Due to its low and reversible oxidn. potential 1 shows the most favorable properties for low voltage LED's: green electroluminescence with luminance at 100-500 cd/m² at 7-10 V was demonstrated. There also was prep'd. an electron donating polymer 5 having addnl. Ph substituents attached to the vinylenic unit. These Ph groups are responsible for high glass transition temp. (TG 197.degree.) and helped to solubilize the chain.

IT 189075-38-5

(synthesis and electroluminescence of novel DSB-segmented copolymers of PAV/PPV type)

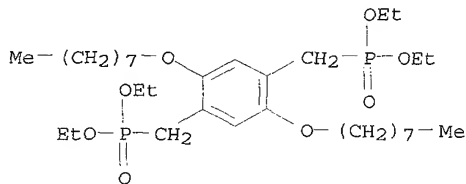
RN 189075-38-5 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with [(phenylimino)di-4,1-phenylene]bis[phenylmethanone] (9CI) (CA INDEX NAME)

CM 1

CRN 176856-31-8

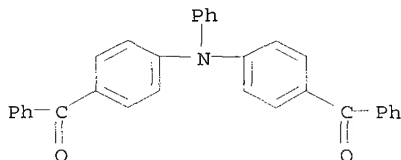
CMF C32 H60 O8 P2



CM 2

CRN 16911-34-5

CMF C32 H23 N O2



CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

IT 188744-21-0 188982-22-1 188982-23-2 189075-38-5

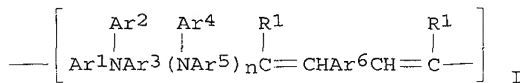
203448-66-2 203448-67-3 203448-68-4

(synthesis and electroluminescence of novel DSB-segmented copolymers of PAV/PPV type)

L64 ANSWER 8 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN

1997:317758 Document No. 126:299531 Polymers containing triarylamine units for use as electroluminescent materials. Kreuder, Willi; Hoerhold, Hans-Heinrich; Rost, Henning (Hoechst A.-G., Germany). PCT Int. Appl. WO 9709394 A1 19970313, 54 pp. DESIGNATED STATES: W: CN, JP, KR; RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (German). CODEN: PIXXD2. APPLICATION: WO 1996-EP3852 19960903. PRIORITY: DE 1995-19532574 19950904; DE 1995-19535938 19950927.

GI



AB Electroluminescent materials are described which include .gtoreq.1 polymers contg. structural units of the formula I (Ar¹-6 = the same or different mononuclear and/or polynuclear aryl and/or heteroaryl groups which may be crosslinked by one or more bridges and/or condensed and which may also be substituted; Ar¹, Ar³, Ar⁵, and Ar⁶ are linked to the chain by two bonds and Ar² and Ar⁴ by one bond; R¹ = H, a C1-22 hydrocarbon group which may be substituted, preferably with F, and may also contain hetero atoms, preferably O, or Ar⁷; Ar⁷ is independently selected from the same groups from which Ar¹-6 are selected; and n = 0, 1, or 2). Methods for prepg. the polymers are also described which entail condensation of selected bisaldehydes or bisketones with an organophosphorus compd. The properties of the electroluminescent materials include a low electroluminescence onset voltage and high efficiency, even though the polymers are not conjugated systems. Electroluminescent devices employing the polymers and the polymers themselves are also claimed.

IT 189075-38-5 (polymers contg. triarylamine units for use as electroluminescent materials and their prepn. and devices using them)

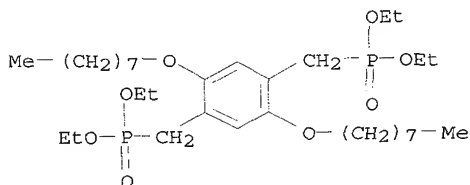
RN 189075-38-5 HCAPIUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with [(phenylimino)di-4,1-phenylene]bis[phenylmethanone] (9CI) (CA INDEX NAME)

CM 1

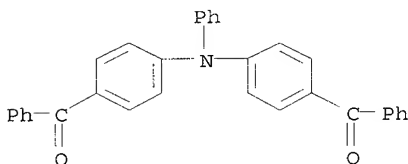
CRN 176856-31-8

CMF C32 H60 O8 P2



CM 2

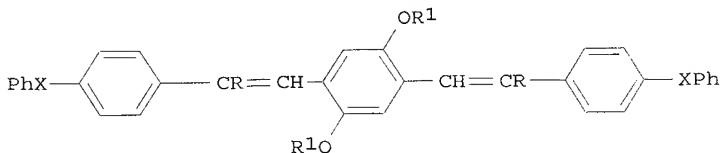
CRN 16911-34-5
CMF C32 H23 N O2



IC ICM C09K011-06
ICS H05B033-14
CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
IT 68-12-2, reactions 122-52-1, Triethylphosphite 437-25-2
603-34-9, Triphenylamine 10025-87-3, Phosphorylchloride
16911-34-5 30525-89-4, Paraformaldehyde 60491-94-3 67399-94-4
189075-38-5 189075-44-3
(polymers contg. triarylamine units for use as electroluminescent materials and their prepn. and devices using them)

L64 ANSWER 9 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1997:217311 Document No. 126:278150 Novel light emitting and photoconducting polyarylenevinylene derivatives containing phenylene arylamine and phenylene oxide units in the main chain. Rost, H.; Teuschel, A.; Pfeiffer, S.; Hoerhold, H.-H. (University of Jena, Institute of Organic Chemistry and Macromolecular Chemistry, Humboldtstr. 10, Jena, 07743, Germany). Synthetic Metals, 84(1-3), 269-270 (English) 1997. CODEN: SYMEDZ. ISSN: 0379-6779. Publisher: Elsevier.

GI



I

AB Four new copolymers with alternating phenylenevinylene and arylenevinylene units were synthesized using the Horner reaction between the appropriate dialdehyde/diketone and a 2,5-dialkoxy-1,4-xylylenebis(di-Et phosphonate). Backbone

conjugation in the polymers, which consist of well-defined distyrylbenzene (DSB) blocks, is interrupted by arylamino or ether groups. Thin films of the polymers exhibit both photoluminescence and electroluminescence, emitting blue, green, and green yellow light. The band gap and oxidn. potential are strongly dependent on the nature of group joining the DSB units. Thus, model compds. having the structure I, where X = NPh or O, R = H or Ph, and R1 = Me or octyl, reflect well the characteristic fluorescence and redox behavior of the resp. polymers. Due to their low oxidn. potential (0.6-0.8V vs. Ag/AgCl) the N-contg. polymers are of particular interest as photoconducting and electroluminescent materials.

IT 188982-24-3P 188982-26-5P

(prepn. and properties of novel light emitting and photoconducting polyarylenevinylene derivs. contg. phenylene arylamine and phenylene oxide units in main chain)

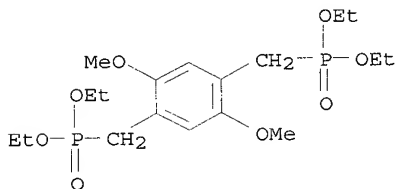
RN 188982-24-3 HCAPLUS

CN Phosphonic acid, [(2,5-dimethoxy-1,4-phenylene)bis(methylene)]bis-, tetraethyl ester, polymer with [(phenylimino)di-4,1-phenylene]bis[phenylmethanone] (9CI) (CA INDEX NAME)

CM 1

CRN 60491-94-3

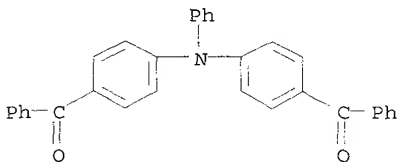
CMF C18 H32 O8 P2



CM 2

CRN 16911-34-5

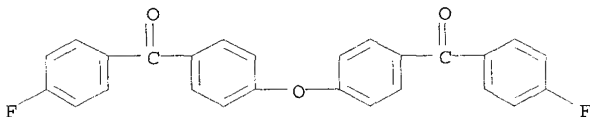
CMF C32 H23 N O2



RN 188982-26-5 HCAPLUS
 CN Phosphonic acid, [(2,5-dimethoxy-1,4-phenylene)bis(methylene)]bis-,
 tetraethyl ester, polymer with (oxydi-4,1-phenylene)bis[(4-
 fluorophenyl)methanone] (9CI) (CA INDEX NAME)

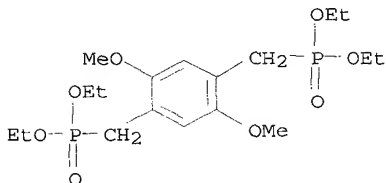
CM 1

CRN 95042-14-1
 CMF C26 H16 F2 O3



CM 2

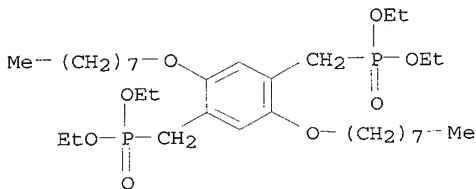
CRN 60491-94-3
 CMF C18 H32 O8 P2



CC 37-5 (Plastics Manufacture and Processing)
 IT 178985-14-3P 188744-19-6P 188744-21-0P 188982-22-1P
 188982-23-2P 188982-24-3P 188982-25-4P
 188982-26-5P

(prepn. and properties of novel light emitting and photoconducting polyarylenevinylene derivs. contg. phenylene arylamine and phenylene oxide units in main chain)

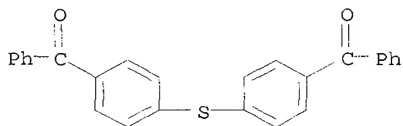
- L64 ANSWER 10 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
 1996:449419 Document No. 125:99554 Poly(paraphenylene vinylene) derivatives and their use as electroluminescent materials. Kreuder, Willi; Lupo, Donald; Salbeck, Josef; Schenk, Hermann; Stehlin, Thomas; Hoerhold, Hans-Heinrich; Lux, Andrea; Teuschel, Annett; Wieduwilt, Martina (Hoechst A.-G., Germany). PCT Int. Appl. WO 9610617 A1 19960411, 56 pp. DESIGNATED STATES: W: CN, JP, US; RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (German). CODEN: PIXXD2. APPLICATION: WO 1995-EP3835 19950928. PRIORITY: DE 1994-4435047 19940930; DE 1995-19505416 19950217.
- AB The use as electroluminescent materials is described of polymers contg. structural units of the general formula [A1-(A2)C:CH-A3-CH:C(A2)]- (A1, A2, and A3, which are identical or different, designate mono and/or polynuclear aryl and/or heteroaryl groups which are optionally linked via one or a plurality of bridges, and preferably via one bridge, and/or are condensed and can be optionally substituted, and wherein A1 and A3 each have two bonds and A2 has one bond). The polymers are distinguished by their high degree of stability at high fluorescence quantum yields. Methods for forming the polymers by using condensation reactions of organophosphorus compds. with diketones, and electroluminescent devices employing films of the polymers, are also described.
- IT 176856-36-3P 176856-39-6P
 (poly(paraphenylene vinylene) derivs. and their use as electroluminescent materials)
- RN 176856-36-3 HCAPLUS
 CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with (thiodi-4,1-phenylene)bis[phenylmethanone] (9CI) (CA INDEX NAME)
- CM 1
- CRN 176856-31-8
 CMF C32 H60 O8 P2



CM 2

CRN 47632-47-3

CMF C26 H18 O2 S



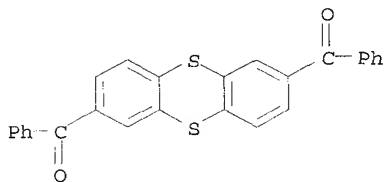
RN 176856-39-6 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 2,7-thianthrenediylbis[phenylmethanone] (9CI) (CA INDEX NAME)

CM 1

CRN 176856-38-5

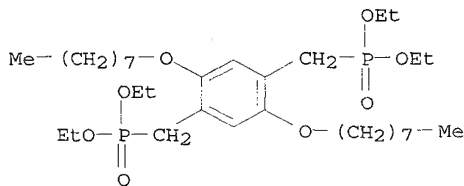
CMF C26 H16 O2 S2



CM 2

CRN 176856-31-8

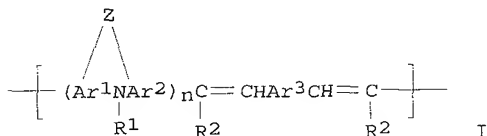
CMF C32 H60 O8 P2



IC ICM C09K011-06
ICS H05B033-14; C08G061-00
CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 38
IT 41040-05-5P 41080-42-6P 41080-43-7P 176856-32-9P
176856-33-0P 176856-34-1P 176856-35-2P 176856-36-3P
176856-39-6P 176856-41-0P 176856-42-1P 176856-43-2P
176856-44-3P 176856-46-5P 176856-47-6P 176856-50-1P
178985-15-4P 178985-16-5P 178985-17-6P 178985-18-7P
178985-20-1P 178985-22-3P 178985-23-4P
(poly(paraphenylene vinylene) derivs. and their use as electroluminescent materials)

L64 ANSWER 11 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1996:377240 Document No. 125:34410 Nitrogenous polymers used as electroluminescent materials. Kreuder, Willi; Hoerhold, Hans-Heinrich; Rost, Henning (Hoechst A.-G., Germany). PCT Int. Appl. WO 9610598 A1 19960411, 38 pp. DESIGNATED STATES: W: CN, JP, US; RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (German). CODEN: PIXXD2. APPLICATION: WO 1995-EP3836 19950928. PRIORITY: DE 1994-4435047 19940930; DE 1995-19505416 19950217.

GI



AB The electroluminescent polymers I [Ar1-3 are mono- and/or polynuclear aryl and/or heteroaryl groups or C atoms (optionally bridged and/or condensed); Z is a single bond, O, S, SO, SO2, amino, CO, alkenylene, silylene, alkylidene; n = 1-3] have good properties

for use in illumination or displays. Vilsmeier polymn. of 3,6-dibenzoyl-9-methylcarbazole (prepd. in 79.3% yield from 9-methylcarbazole, BzCl, and AlCl₃ in C₂H₄Cl₂ at 0.degree.) with tetra-Et [[2,5-bis(octyloxy)-1,4-phenylene]dimethylene]diphosphonate in the presence of tert-BuOK in refluxing PhMe gave a polymer (II) with glass temp. 90.degree., fluorescence max. 505 nm, and mol. wt. 11,300. A film of II on In-Zn oxide had max. efficiency 0.032 and max. light d. 120 Cd/m² at 13 V and 7 mA/4 mm².

IT 177961-05-6P

(nitrogenous polymers used as electroluminescent materials)

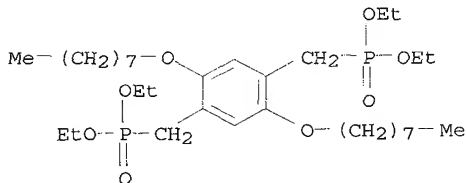
RN 177961-05-6 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with (9-methyl-9H-carbazole-3,6-diyl)bis[phenylmethanone] (9CI) (CA INDEX NAME)

CM 1

CRN 176856-31-8

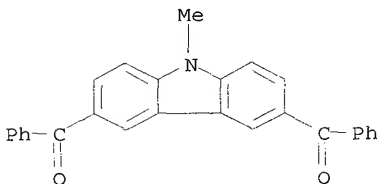
CMF C32 H60 O8 P2



CM 2

CRN 78544-71-5

CMF C27 H19 N O2

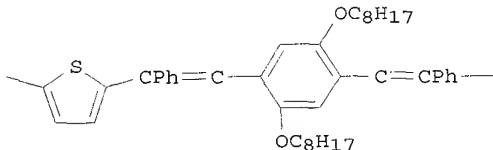


IC ICM C08G073-06

ICS C09K011-06; H05B033-14
 CC 35-5 (Chemistry of Synthetic High Polymers)
 Section cross-reference(s): 74
 IT 177961-05-6P 177961-06-7P 177961-07-8P 177961-08-9P
 (nitrogenous polymers used as electroluminescent materials)

L64 ANSWER 12 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
 1996:318425 Document No. 124:345038 Poly(p-phenylenevinylene)
 derivatives and their use as electroluminescent materials. Kreuder,
 Willi; Lupo, Donald; Salbeck, Josef; Schenk, Hermann; Stehlin,
 Thomas; Hoerhold, Hans-Heinrich; Lux, Andrea; Teuschel, Annett;
 Wieduwilt, Martina (Hoechst A.-G., Germany). Ger. Offen. DE 4435047
 A1 19960404, 26 pp. (German). CODEN: GWXXBX. APPLICATION: DE
 1994-4435047 19940930.

GI



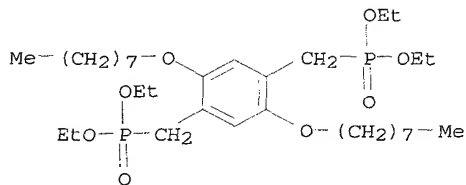
AB The title polymer derivs. contain units A1(A2)C:CHA3CH:C(A2) (A1-3 =
 mono- or polynuclear arom. or hetero arom. groups) and show good
 stability and high fluorescence yield. Heating 2,5-
 dibenzoylthiophene and 2,5-dioctoxy-1,4-xylylenebis(di-Et
 phosphonate) in the presence of Me3COK gave a dark-red polymer
 contg. units I.

IT 176856-36-3P 176856-39-6P
 (prepn. and use as electroluminescent material)

RN 176856-36-3 HCAPLUS
 CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-
 phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with
 (thiodi-4,1-phenylene)bis[phenylmethanone] (9CI) (CA INDEX NAME)

CM 1

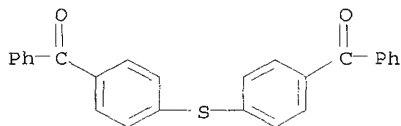
CRN 176856-31-8
 CMF C32 H60 O8 P2



CM 2

CRN 47632-47-3

CMF C26 H18 O2 S



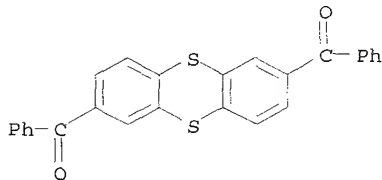
RN 176856-39-6 HCAPLUS

CN Phosphonic acid, [[2,5-bis(octyloxy)-1,4-phenylene]bis(methylene)]bis-, tetraethyl ester, polymer with 2,7-thianthrenediylbis[phenylmethanone] (9CI) (CA INDEX NAME)

CM 1

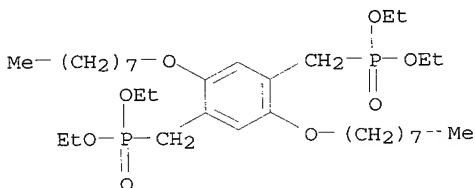
CRN 176856-38-5

CMF C26 H16 O2 S2



CM 2

CRN 176856-31-8
CMF C32 H60 O8 P2



IC ICM C08G061-00
ICS C09K011-06; C07D417-14; C07D409-06; C07D407-08; H05B033-14
ICA C08G061-02; C08G061-12; C07C323-22; C07C319-20; C07C043-205;
C07C043-225; C07C041-22; C07C041-30; C07C041-16; C07F009-40;
C07D339-08; C07D333-06
CC 37-5 (Plastics Manufacture and Processing)
Section cross-reference(s): 35
IT 41040-04-4P 41040-05-5P 41080-42-6P 41080-43-7P
176856-32-9P, 2,5-Dibenzoylthiophene-2,5-dioctoxy-1,4-
xylylenebis(diethyl phosphonate) copolymer 176856-33-0P,
2,5-Dibenzoylthiophene-2,5-dioctoxy-1,4-xylylenebis(diethyl
phosphonate) copolymer, sru 176856-34-1P 176856-35-2P
176856-36-3P 176856-37-4P 176856-39-6P
176856-40-9P 176856-41-0P 176856-42-1P 176856-43-2P
176856-44-3P 176856-46-5P 176856-47-6P 176856-49-8P
176856-50-1P 176856-51-2P 176856-52-3P 176856-53-4P
(prepn. and use as electroluminescent material)

L64 ANSWER 13 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1993:417620 Document No. 119:17620 Organic thin-film
electroluminescent elements. Higashi, Hisahiro; Hosokawa, Chishio;
Tokailin, Hiroshi (Idemitsu Kosan Co., Ltd., Japan). PCT Int. Appl.
WO 9205131 A1 19920402, 143 pp. DESIGNATED STATES: W: JP, US; RW:
AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, NL, SE. (Japanese).
CODEN: PIXXD2. APPLICATION: WO 1991-JP1228 19910917. PRIORITY: JP
1990-248749 19900920; JP 1990-279304 19901019.
AB The element comprises a phosphor consisting of a dimeric styryl
deriv. G(F)C:C(E)DQD'(E')C:C(F')G' (D,D' = (un)substituted C6-20
allylene, C3-20 divalent arom. heterocyclic; E,E',F,F',G,G' = H,
C6-20 aryl or cyclohexyl, C1-10 alkyl, C7-20 aralkyl, C1-10 alkoxy,
(un)substituted C3-20 monovalent arom. heterocyclic; F and G, or F'
and G' are not H simultaneously; substituted groups = C1-6 alkyl,
C1-6 alkoxy, C1-6 acyl, C7-8 aralkyl, C6-20 aryloxy, C2-7
alkoxycarbonyl, C7-21 aryloxycarbonyl, C1-6 acyloxy, C1-6 acylamino,
halo, carboxyl, aminocarbonyl, OH, CN, NO2, NH2; .gtoreq.1
substituent includes alkyl, alkoxy, aryloxy, NH2, (un)substituted
phenyl; E and D, E' and D', F and G, or F' and G' may form (un)satd.

5- or 6-membered rings; Q = divalent group. The element, suited for use in a variety of display devices, is prepd. by bonding 2 mols. of a compd. having a good luminescence efficiency via the Q group without impairing the abilities of the compd., thereby improving thin-film characteristics.

IT 146997-01-5P

(prepn. and use of, as electroluminescent phosphors, greenish-blue-emitting)

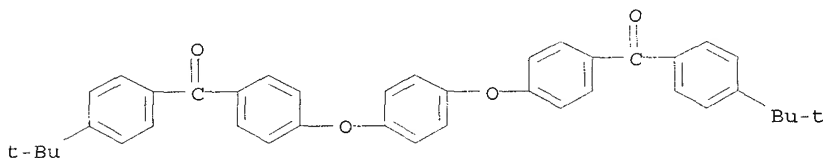
RN 146997-01-5 HCAPLUS

CN Phosphonic acid, [[1,1'-biphenyl]-4,4'-diylbis(methylene)]bis-, tetraethyl ester, polymer with [1,4-phenylenebis(oxy-4,1-phenylene)]bis[[4-(1,1-dimethylethyl)phenyl]methanone] (9CI) (CA INDEX NAME)

CM 1

CRN 146823-44-1

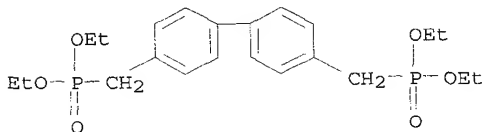
CMF C40 H38 O4



CM 2

CRN 17919-34-5

CMF C22 H32 O6 P2



IC ICM C07C013-28

ICS C07C015-50; C07C001-32; C07C043-243; C07C041-01; C07C049-84; C07C045-68; C07D209-86; C07D521-00; C09K011-06; C09B023-14; H05B033-22

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 74

IT 146997-01-5P

(prepn. and use of, as electroluminescent phosphors,
greenish-blue-emitting)

L64 ANSWER 14 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN

1989:58119 Document No. 110:58119 Bis- or tetra-maleimides of substituted s-triazines chain-extended by imide, amide, and urea groups for fire- and heat-resistant applications. Mikroyannidis, John A.; Melissaris, Anastasios P. (Dep. Chem., Univ. Patras, Patras, 260 01, Greece). Journal of Polymer Science, Part A: Polymer Chemistry, 26(5), 1405-18 (English) 1988. CODEN: JPACEC. ISSN: 0887-624X.

AB Novel phosphorylated bismaleimides and nonphosphorylated tetramaleimides contg. substituted s-triazine rings (chain-extended by imide, amide, or urea groups) were prep'd. and poly'd. These polymer precursors were prep'd. by treating 2,4-bis(4-aminophenoxy)-6-diethoxyphosphinyl-s-triazine or 2,4,6-tris(4-aminophenoxy)-s-triazine with maleic anhydride in combination with a bridging agent such as pyromellitic or benzophenone tetracarboxylic dianhydride, terephthaloyl chloride, and TDI. The structure of polymer precursors was confirmed by IR and 1H-NMR spectroscopy and their curing behavior was investigated by DTA. The phosphorylated bismaleimides thermally poly'd. at a lower temp. than did the corresponding nonphosphorylated tetramaleimides. Dynamic TGA showed that the nonphosphorylated and phosphorylated cured resins were stable up to 320-370 and 312-327.degree., resp., in N or air atm. In addn., the latter afforded a relatively higher char yield. The relative thermal and thermooxidative stability of polymers with regard to the chem. structure of the bridging group decreased in the order imide > amide > urea. Upon isothermal aging, the phosphorylated polymers exhibited a lower wt. loss than did the corresponding nonphosphorylated polymers.

IT 118363-52-3P

(prepn. and thermal stability of)

RN 118363-52-3 HCAPLUS

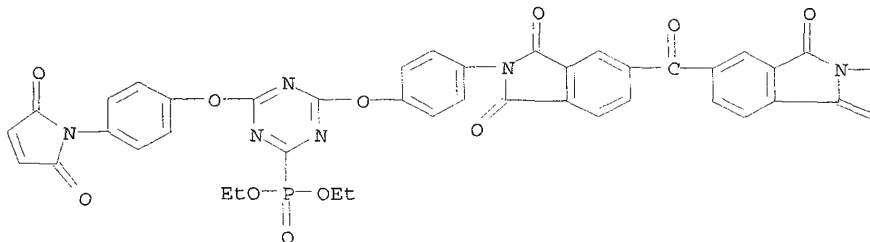
CN Phosphonic acid, [carbonylbis[{1,3-dihydro-1,3-dioxo-2H-isoindole-5,2-diyl}-4,1-phenyleneoxy[6-[4-(2,5-dihydro-2,5-dioxo-1H-pyrrol-1-yl)phenoxy]-1,3,5-triazine-4,2-diyl}]]bis-, tetraethyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

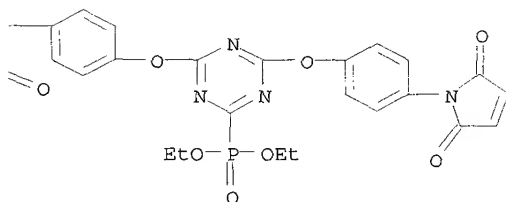
CRN 118363-51-2

CMF C63 H46 N10 O19 P2

PAGE 1-A



PAGE 1-B



CC 35-2 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 37

IT 118363-44-3P 118363-46-5P 118363-48-7P 118363-50-1P
 118363-52-3P 118363-54-5P 118626-35-0P 118626-36-1P
 (prepn. and thermal stability of)

L64 ANSWER 15 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN

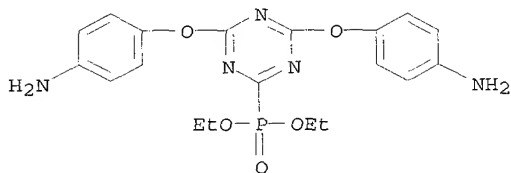
1988:187354 Document No. 108:187354 Synthesis, physical and thermal characterization of phosphorus-containing homopolymers and copolymers based on 2,4-bis(4-aminophenoxy)-6-diethoxyphosphinyl-s-triazine. Melissaris, Anastasios P.; Mikroyannidis, John A. (Dep. Chem., Univ. Patras, Patras, 260 01, Greece). Journal of Applied Polymer Science, 35(3), 831-45 (English) 1988. CODEN: JAPNAB. ISSN: 0021-8995.

AB Phosphorus-contg. polyimides, polyamides, and polyureas were prepd. by reacting 2,4-bis(4-aminophenoxy)-6-diethoxyphosphinyl-s-triazine with pyromellitic or benzophenonetetracarboxylic dianhydride, terephthaloyl chloride, and TDI, resp. These polymers were characterized by inherent viscosity measurements, IR and 1H-NMR spectroscopy as well as by DTA and TGA. The copolymers were stable

up to 233-272.degree. in N or air atm.
 IT 114178-72-2P 114178-74-4P 114178-75-5P
 114178-76-6P 114178-84-6P 114188-50-0P
 (prepn. and characterization of)
 RN 114178-72-2 HCAPLUS
 CN 1H,3H-Benzo[1,2-c:4,5-c']difuran-1,3,5,7-tetrone, polymer with
 diethyl [4,6-bis(4-aminophenoxy)-1,3,5-triazin-2-yl]phosphonate and
 4,4'-sulfonylbis[benzenamine] (9CI) (CA INDEX NAME)

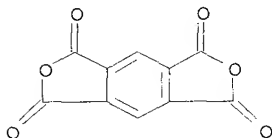
CM 1

CRN 114166-89-1
 CMF C19 H22 N5 O5 P



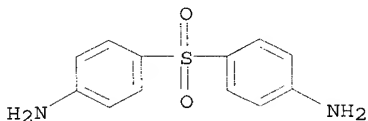
CM 2

CRN 89-32-7
 CMF C10 H2 O6



CM 3

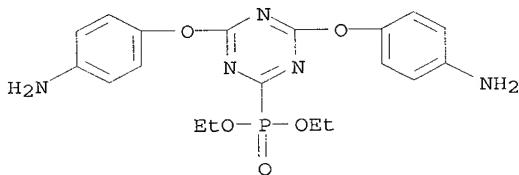
CRN 80-08-0
 CMF C12 H12 N2 O2 S



RN 114178-74-4 HCAPLUS
 CN Phosphonic acid, [4,6-bis(4-aminophenoxy)-1,3,5-triazin-2-yl]-,
 diethyl ester, polymer with 5,5'-carbonylbis[1,3-isobenzofurandione]
 (9CI) (CA INDEX NAME)

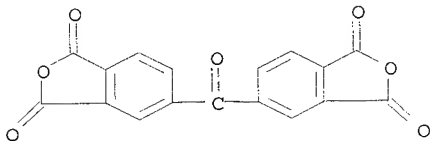
CM 1

CRN 114166-89-1
 CMF C19 H22 N5 O5 P



CM 2

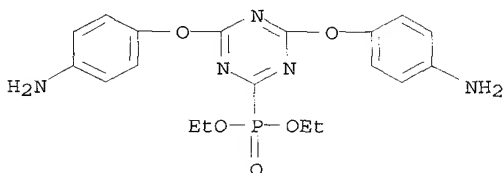
CRN 2421-28-5
 CMF C17 H6 O7



RN 114178-75-5 HCAPLUS
 CN 1,3-Isobenzofurandione, 5,5'-carbonylbis-, polymer with diethyl
 [4,6-bis(4-aminophenoxy)-1,3,5-triazin-2-yl]phosphonate and
 4,4'-sulfonylbis[benzenamine] (9CI) (CA INDEX NAME)

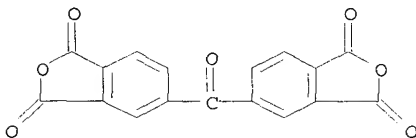
CM 1

CRN 114166-89-1
CMF C19 H22 N5 O5 P



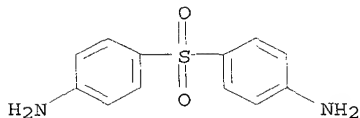
CM 2

CRN 2421-28-5
CMF C17 H6 O7



CM 3

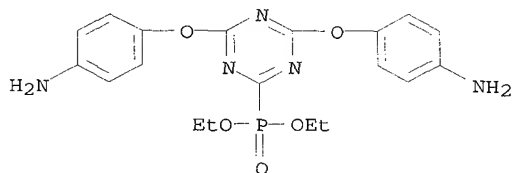
CRN 80-08-0
CMF C12 H12 N2 O2 S



RN 114178-76-6 HCAPLUS
CN 1,4-Benzenedicarbonyl dichloride, polymer with diethyl
[4,6-bis(4-aminophenoxy)-1,3,5-triazin-2-yl]phosphonate and
4,4'-sulfonylbis[benzenamine] (9CI) (CA INDEX NAME)

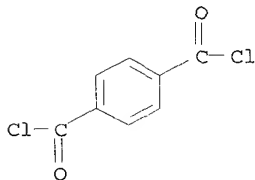
CM 1

CRN 114166-89-1
CMF C19 H22 N5 O5 P



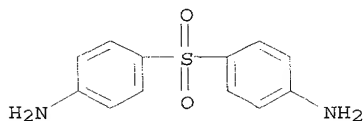
CM 2

CRN 100-20-9
CMF C8 H4 Cl2 O2



CM 3

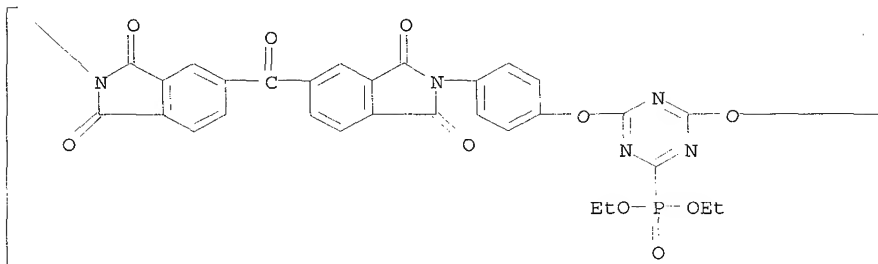
CRN 80-08-0
CMF C12 H12 N2 O2 S



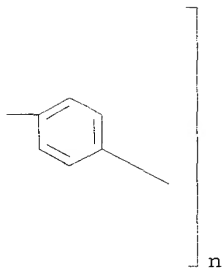
RN 114178-84-6 HCAPLUS
CN Poly[(1,3-dihydro-1,3-dioxo-2H-isoindole-2,5-diyl)carbonyl(1,3-dihydro-1,3-dioxo-2H-isoindole-5,2-diyl)-1,4-phenyleneoxy[6-(diethoxyphosphinyl)-1,3,5-triazine-2,4-diyl]oxy-1,4-phenylene]

(9CI) (CA INDEX NAME)

PAGE 1-A



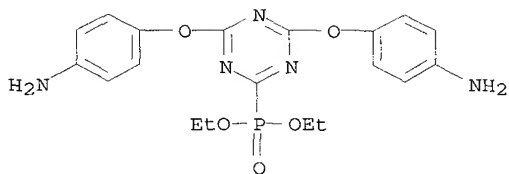
PAGE 1-B



RN 114188-50-0 HCAPLUS
 CN Phosphonic acid, [4,6-bis(4-aminophenoxy)-1,3,5-triazin-2-yl]-, diethyl ester, polymer with 1,3-diisocyanatomethylbenzene and 4,4'-sulfonylbis[benzenamine] (9CI) (CA INDEX NAME)

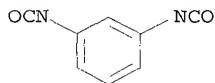
CM 1

CRN 114166-89-1
 CMF C19 H22 N5 O5 P



CM 2

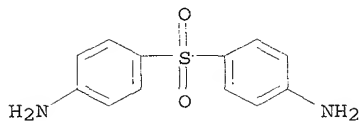
CRN 26471-62-5
CMF C9 H6 N2 O2
CCI IDS



D1-Me

CM 3

CRN 80-08-0
CMF C12 H12 N2 O2 S



CC 35-5 (Chemistry of Synthetic High Polymers)
IT 114166-90-4P 114178-71-1P 114178-72-2P 114178-73-3P
114178-74-4P 114178-75-5P 114178-76-6P
114178-82-4P 114178-83-5P 114178-84-6P
114188-50-0P 114265-73-5P
(prepn. and characterization of)

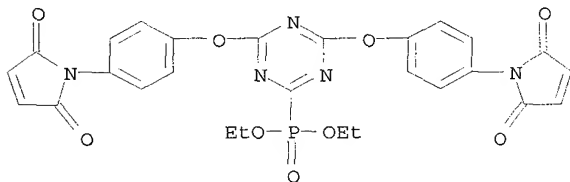
L64 ANSWER 16 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN

- 1988:6528 Document No. 108:6528 Polymerization of maleimides containing s-triazine rings in presence of aromatic di- or triamines. Melissaris, Anastasios P.; Mikroyannidis, John A. (Dep. Chem., Univ. Patras, Patras, GR-260 01, Greece). Polymer Bulletin (Berlin, Germany), 18(1), 1-8 (English) 1987. CODEN: POBUDR. ISSN: 0170-0839.
- AB 2,4,6-Tris[4-(maleimido)phenoxy]-s-triazine or 2,4-bis[4-(maleimido)phenoxy]-6-diethoxyphosphinyl-s-triazine was polymd. with various arom. di- or triamines. The maleimide-amine adducts initiated a thermal polymn. at lower temp. than did the corresponding neat maleimides. The thermal stability of cured resins was evaluated by thermogravimetric anal. The cured resins derived from the maleimide-amine adducts were less thermally stable than those of the corresponding neat maleimides. The initial decompn. temp. of the polymers obtained from the maleimide-amine adducts was not remarkably influenced by the chem. structure of the arom. amine utilized.
- IT 111939-99-2P
(prepn. and thermogravimetric anal. of)
- RN 111939-99-2 HCAPLUS
- CN Phosphonic acid, [4,6-bis[4-(2,5-dihydro-2,5-dioxo-1H-pyrrol-1-yl)phenoxy]-1,3,5-triazin-2-yl]-, diethyl ester, polymer with 4,4'-sulfonylbis[benzenamine] (9CI) (CA INDEX NAME)

CM 1

CRN 111939-96-9

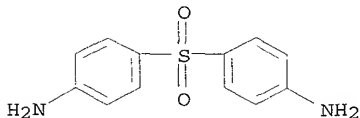
CMF C27 H22 N5 O9 P



CM 2

CRN 80-08-0

CMF C12 H12 N2 O2 S



CC 35-4 (Chemistry of Synthetic High Polymers)

IT 111939-92-5P 111939-93-6P 111939-94-7P 111939-95-8P
 111939-97-0P 111939-98-1P 111939-99-2P 111940-00-2P
 (prepn. and thermogravimetric anal. of)

L64 ANSWER 17 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN

1985:505648 Document No. 103:105648 Aromatic polyphosphonates:
 exceptionally flame-resistant thermoplastic polymers. Schmidt,
 Manfred; Freitag, Dieter; Bottenbruch, Ludwig; Reinking, Klaus
 (Ressorts Forsch., Bayer A.-G., Krefeld-Uerdingen, D-4150, Fed. Rep.
 Ger.). Angewandte Makromolekulare Chemie, 132, 1-18 (German) 1985.
 CODEN: ANMCBO. ISSN: 0003-3146.

AB Branched thermoplastic high-mol.-wt. arom. polyphosphonates having
 good processability and impact, heat, and flame resistance were
 synthesized by polycondensation of arom. diols. with di-Ph
 phosphonates in the presence of an alk. polymn. catalyst and <1 mol%
 crosslinking agent. Pyrolysis of poly(4,4'-dioxybiphenyl
 methylphosphonate) (I) [57389-44-3] in air at 1000.degree. yielded
 gases contg. 66% of the polymer-bound P as H3PO4 and (HO)2P(O)Me. I
 showed no viscosity change after soaking 4 days at room temp. in
 H2O. Heat resistance of the polyphosphonates was increased by
 incorporating (PhO)2CO or a 50:50 mixt. of iso-/terephthalic acid
 into the polymer backbone, giving amorphous thermoplastic
 polycarbonate- or polyester-polyphosphonates with analogous
 properties to the original polyphosphonates.

IT 97916-84-2P
 (prepn. of branched, thermoplastic, heat- and flame-resistant)

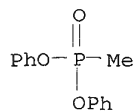
RN 97916-84-2 HCAPLUS

CN Carbonic acid, diphenyl ester, polymer with 1,4-benzenediol,
 diphenyl methylphosphonate, 4,4'-(1-methylethylidene)bis[phenol] and
 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

CM 1

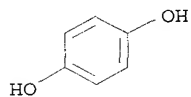
CRN 7526-26-3

CMF C13 H13 O3 P



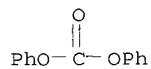
CM 2

CRN 123-31-9
CMF C6 H6 O2



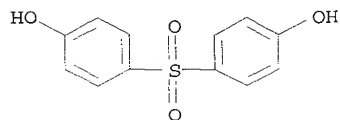
CM 3

CRN 102-09-0
CMF C13 H10 O3



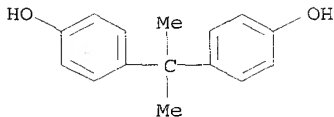
CM 4

CRN 80-09-1
CMF C12 H10 O4 S



CM 5

CRN 80-05-7
CMF C15 H16 O2



CC 37-5 (Plastics Manufacture and Processing)
IT 27734-80-1P 31868-41-4P 35398-61-9P 56266-19-4P 57389-44-3P
68664-06-2P 77226-90-5P 79313-99-8P 86228-20-8P 97916-72-8P
97916-73-9P 97916-74-0P 97916-75-1P 97916-76-2P 97916-77-3P
97916-78-4P 97916-79-5P 97916-80-8P 97916-81-9P 97916-82-0P
97916-83-1P 97916-84-2P 97916-85-3P 97916-86-4P
97917-28-7P 97917-29-8P
(prepn. of branched, thermoplastic, heat- and flame-resistant)

=> d 156 1-12 ti

- L56 ANSWER 1 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI An innovative method for the preparation of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors
- L56 ANSWER 2 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI Ion conducting composite membrane materials containing an optionally modified zirconium phosphate dispersed in a polymeric matrix, preparation of membrane material, and use
- L56 ANSWER 3 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI **Proton-conductive** polymer membrane and its use in **fuel cell**
- L56 ANSWER 4 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI Thermally crosslinkable polymer solid electrolyte for **fuel cell**, polymer solid electrolyte film, and manufacture thereof
- L56 ANSWER 5 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI Photocrosslinkable polymer solid electrolyte for **fuel cell** proton exchange film, photocrosslinking polymer solid electrolyte film, and manufacture thereof,
- L56 ANSWER 6 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
TI **Proton-conducting** sulfonated **polysulfone** -polyethers and polyketone-polyethers as **fuel cell** separators

- L56 ANSWER 7 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
 TI **Proton-conductive** membrane for electrochemical applications
- L56 ANSWER 8 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
 TI Oligomeric **proton-conducting** polyimide and acid-functionalized block copolymers as **fuel cell** polymer separators
- L56 ANSWER 9 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
 TI Aromatic polyether containing **phosphonate** groups and a process for the manufacture thereof
- L56 ANSWER 10 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
 TI Synthesis and **proton conductivities** of **phosphonic acid** containing poly-(arylene ether)s
- L56 ANSWER 11 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
 TI Solid polymer electrolyte having high-durability
- L56 ANSWER 12 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
 TI Composite solid polymer electrolyte membranes

=> d l56 1,3,4,5,6,7,9,10,12 cbib abs hitstr hitind

- L56 ANSWER 1 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
 2003:778142 An innovative method for the preparation of **proton conducting** nanopolymeric membranes for use in **fuel cells** or in catalytic membrane reactors. Alberti, Giulio; Casciola, Mario; Pica, Monica (Fuma-Tech G.m.b.H., Germany). PCT Int. Appl. WO 2003081691 A2 20031002, 31 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2003-EP2904 20030320. PRIORITY: IT 2002-PG15 20020322.
- AB The invention is based on the prepn. of an org. soln. of preferably **phosphonic acids** and tetravalent metals salts, preferably of Zr, Ti, Sn and Ce, in org. solvents, which behaves as a soln. of layered tetravalent metals salts, preferably phosphate-**phosphonates**, which are completely insol. in the known solvents. This peculiarity allows an easy insertion of particles of the above compds. in the pores of porous membranes, in the matrixes of those polymers, which are sol. in the same org. solvents, as well as in the membrane/electrode interfaces of **fuel**

cells. The use of tetravalent metals salts, preferably zirconium phosphate-phosphonates, possessing high **proton cond.** (in some cases higher than 10^{-1} S cm^{-1}) allows the prepn. of impregnated porous membranes and of nano-polymeric membranes combining good mech. properties, and/or reduced permeability to gaseous species, with good **proton cond.** These membranes can therefore be employed in fuel cells even at temps. higher than 80.degree.. These membranes also possess a high catalytic activity and can therefore be employed in catalytic membrane reactors.

- IC ICM H01M
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 47
- ST **fuel cell** use conducting nanopolymeric membrane
prepn; catalytic membrane reactor use conducting nanopolymeric
membrane prepn; zirconium phosphate **phosphonate** conducting
nanopolymeric membrane
- IT Pore
(dimension; innovative method for prepn. of **proton**
conducting nanopolymeric membranes for use in
fuel cells or in catalytic membrane reactors)
- IT Polyoxyalkylenes
(fluorine- and sulfo-contg., ionomers; innovative method for
prepn. of **proton conducting** nanopolymeric
membranes for use in **fuel cells** or in
catalytic membrane reactors)
- IT Ceramic membranes
Solid state **fuel cells**
(innovative method for prepn. of **proton**
conducting nanopolymeric membranes for use in
fuel cells or in catalytic membrane reactors)
- IT Chlorides
Fluoro rubber
Metal alkoxides
Phosphates
Polyesters
(innovative method for prepn. of **proton**
conducting nanopolymeric membranes for use in
fuel cells or in catalytic membrane reactors)
- IT Reactors
(membrane, catalytic; innovative method for prepn. of
proton conducting nanopolymeric membranes for
use in **fuel cells** or in catalytic membrane
reactors)
- IT Sulfonic acids
(perfluorosulfonic acid polymers; innovative method for prepn. of
proton conducting nanopolymeric membranes for
use in **fuel cells** or in catalytic membrane
reactors)
- IT Polyketones
Polysulfones
(polyether-, sulfonated; innovative method for prepn.

of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)

IT Polysulfones

(polyether-; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)

IT Polyethers

(polyketone-, sulfonated; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)

IT Fluoropolymers

(polyoxyalkylene-, sulfo-contg., ionomers; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)

IT Ionomers

(polyoxyalkylenes, fluorine- and sulfo-contg.; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)

IT Polyethers

(polysulfone-, sulfonated; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)

IT Polyethers

(polysulfone-; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)

IT Carboxylic acids

(salts; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)

IT Fluoropolymers

(sulfo-contg., perfluoro; innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)

IT 60-35-5, Acetamide 67-68-5, DmsO 68-12-2, Dmf 75-05-8, Acetonitrile 123-91-1, Dioxan 872-50-4, n-Methyl-2-pyrrolidone 7440-31-5D, Tin, salts 7440-32-6D, Titanium, salts 7440-45-1D, Cerium, salts 7440-67-7D, Zirconium, salts 7699-43-6, Zirconyl chloride 9002-84-0, PtfE 15477-76-6, phosphonate 24937-79-9, PvdF 25710-96-7, Zirconium propionate 93615-63-5, nafion 1100

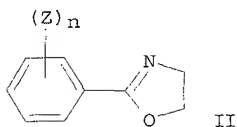
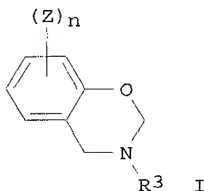
(innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)

- IT 13772-29-7DP, solid soln. with zirconium phosphate and phosphonate contg. org. diacids 116405-42-6P
131249-73-5DP, solid soln. with zirconium phosphate and phosphonate contg. org. diacids 608103-65-7DP, solid soln. with zirconium phosphate and phosphonate contg. org. diacids 608103-65-7P
(innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)
- IT 24937-79-9D, Polyvinylidene fluoride, sulfonated (innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)
- IT 67-56-1, Methanol 1333-74-0, Hydrogen (innovative method for prepn. of proton conducting nanopolymeric membranes for use in fuel cells or in catalytic membrane reactors)
- L56 ANSWER 3 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:628405 Document No. 139:166954 Proton-conductive polymer membrane and its use in fuel cell. Kuromatsu, Hidehisa; Minamimura, Kiyoyuki (Kanegafuchi Chemical Industry Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003229143 A2 20030815, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-29044 20020206.
- AB The membrane contains polymers having SO₃H-contg. arom. rings and has P content 0.001-5%. The membrane has high proton cond. and oxidn. resistance and is useful for an electrolyte in a solid polymer fuel cell.
- IC ICM H01M008-02
ICS C08J005-22; C08K003-32; C08L043-02; C08L081-04; C08L101-02; H01M008-10
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology) Section cross-reference(s): 38, 76
- ST fuel cell electrolyte proton conductive polymer membrane
- IT Polysulfones, uses (polyether-, arom., sulfonated; proton-conductive sulfo-contg. arom. ring polymer membrane for fuel cell electrolyte with high oxidn. resistance)
- IT Polyethers, uses (polysulfone-, arom., sulfonated; proton-conductive sulfo-contg. arom. ring polymer membrane for fuel cell electrolyte with high oxidn. resistance)
- IT Fuel cell electrolytes (proton-conductive sulfo-contg. arom. ring polymer membrane for fuel cell electrolyte with high oxidn. resistance)
- IT Ionic conductors (protonic; proton-conductive

- sulfo-contg. arom. ring polymer membrane for fuel cell electrolyte with high oxidn. resistance)
- IT Polythiophenylenes
(sulfonated; **proton-conductive** sulfo-contg. arom. ring polymer membrane for fuel cell electrolyte with high oxidn. resistance)
- IT 9016-75-5DP, Poly(phenylene sulfide), sulfonated
(Torelina; **proton-conductive** sulfo-contg. arom. ring polymer membrane for fuel cell electrolyte with high oxidn. resistance)
- IT 1343-93-7 27754-99-0, Poly(vinylphosphonic acid)
(membrane contg.; **proton-conductive** sulfo-contg. arom. ring polymer membrane for fuel cell electrolyte with high oxidn. resistance)
- IT 25667-42-9DP, sulfonated
(**proton-conductive** sulfo-contg. arom. ring polymer membrane for fuel cell electrolyte with high oxidn. resistance)

L56 ANSWER 4 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:586587 Document No. 139:152288 Thermally crosslinkable polymer solid electrolyte for fuel cell, polymer solid electrolyte film, and manufacture thereof. Kitamura, Kota; Takase, Satoshi; Sakaguchi, Yoshimitsu; Nagahara, Shigenori; Hamamoto, Shiro; Nakao, Junko (Toyobo Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003217343 A2 20030731, 9 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 2002-15987 20020124.

GI

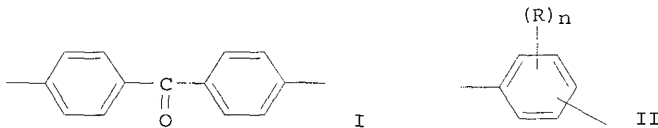


- AB The thermally crosslinkable polymer solid electrolyte has .gtoreq.1 ionic group and .gtoreq.1 thermally crosslinkable group in the mol. The ionic group may be sulfonic acid or **phosphonic acid** group. Thermally crosslinkable group may be -C6H4(Z)n-C.tplbond.R1, -C6H4(Z)n-OCH2-C.tplbond.R2, I -C6H4(Z)n-CR6=CR4R5, CH2-CR9=CR8R7, or II (Z = mH, C12-10 hydrocarbon, halo, etc.; R1-9 = H, C1-10 alkyl, Ph, etc.; X = H, monovalent metal ion; and n = integer 1-4). The polymer backbone chain may be polyethersulfone or polyether ketone.
- IC ICM H01B001-06

- ICS C08G065-40; C08G075-23; C08J005-22; H01B013-00; H01M008-02;
H01M008-10
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 35, 38
- ST thermally crosslinkable polymer solid electrolyte fuel
cell
- IT Polyketones
Polysulfones, uses
(polyether-; thermally crosslinkable polymer solid
electrolyte for fuel cell)
- IT Polyethers, uses
(polyketone-; thermally crosslinkable polymer solid electrolyte
for fuel cell)
- IT Polyethers, uses
(polysulfone-; thermally crosslinkable polymer solid
electrolyte for fuel cell)
- IT Fuel cell electrolytes
Fuel cells
(thermally crosslinkable polymer solid electrolyte for
fuel cell)
- IT 569346-21-ODP, Disodium 4,4'-dichlorodiphenylsulfone-3,3'-
disulfonate-4,4'-dichlorodiphenylsulfone-biphenol copolymer,
reaction product with 4-ethynylphenol
(crosslinked; thermally crosslinkable polymer solid electrolyte
for fuel cell)

L56 ANSWER 5 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
2003:586586 Document No. 139:124155 Photocrosslinkable polymer solid
electrolyte for fuel cell proton exchange film,
photocrosslinking polymer solid electrolyte film, and manufacture
thereof,. Kitamura, Kota; Takase, Satoshi; Sakaguchi, Yoshimitsu;
Nagahara, Shigenori; Hamamoto, Shiro; Nakao, Junko (Toyobo Co.,
Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003217342 A2 20030731, 8
pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-15986
20020124.

GI



AB The photocrosslinking polymer solid electrolyte contains .gtoreq.1
ionic group and .gtoreq.1 photocrosslinkable group om the mol. The
ionic group may be sulfonic acid or phosphonic acid. The
photocrosslinkable group may be represented by I and II (R = C1-10
aliph. hydrocarbon; and n = integer 1-4). The polymer backbone

IC ICM H01B001-06
ICS C08G065-40; C08G075-23; H01B013-00; H01M008-02; H01M008-10
CC 72-2 (Electrochemistry)

ST photocrosslinkable polymer solid electrolyte fuel cell proton exchange film; polyethersulfone polyether ketone polymer solid electrolyte

Polymer electrolytes
(photocrosslinkable polymer solid electrolyte for fuel
cell proton exchange film)

Polysulfones, uses
(polyether-; photocrosslinkable polymer solid
electrolyte for fuel cell proton exchange
film)

(polyketone-; photocrosslinkable polymer solid electrolyte for fuel cell proton exchange film)

(polysulfone-; photocrosslinkable polymer solid electrolyte for fuel cell proton exchange film)

(photocrosslinkable polymer solid electrolyte for fuel cell proton exchange film)

2003:554038 Document No. 139:119905 **Proton-**
conducting sulfonated polysulfone-
polyethers and polyketone-polyethers as fuel
cell separators. Sasaki, Shigeru; Yashiro, Arihiro; Hidaka,
Yasuaki; Taniguchi, Yakumi (Sumitomo Chemical Company Limited,
Japan). Fr. Demande FR 2834716 A1 20030718, 36 pp. (French).
CODEN: FRXXBL. APPLICATION: FR 2003-385 20030115. PRIORITY: JP
2002-5797 20020115; JP 2002-5796 20020115.

GI



polyether-polyketones or polyether-polysulfones, of general structure I, in which Z = -SO₂- or -C(:O)-; x and y = 0.01-0.99 (x + y = 1); -Ar- is a C₄-18-arylene and can contain heteroatoms; n ≦ 8; and R and R' = H or alkyl, in addn. to at least one other component selected from phosphoric acid (or deriv.) and a polymer electrolyte. The polymer has a **proton** cond. of ≧ 10⁻⁴ S/cm. The phosphoric acid deriv. has the general formula O:P(OR₂)_k(OH)_{3-k}, in which R₂ = C₁-6-alkyl or an aryl group, and; k = 0-2. The **phosphonic** acid groups are grafted onto the polymer by bromination with N-bromosuccinimide, followed by reaction with tri-Et phosphite in the presence of NiCl₂.

- IT 122-52-1DP, Triethyl phosphite, reaction products with sulfonated brominated polysulfone-polyethers (membranes; **proton-conducting** sulfonated polysulfone-polyethers and polyketone-polyethers as fuel cell separators)
- RN 122-52-1 HCAPLUS
- CN Phosphorous acid, triethyl ester (8CI, 9CI) (CA INDEX NAME)

OEt

EtO-P-OEt

- IC ICM C08L071-12
ICS C08K005-521; C08J005-22; H01M008-10
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology) Section cross-reference(s): 38
- ST fuel cell **proton conducting** membrane polysulfone polyether; sulfonated polysulfone polyether fuel cell membrane; polyketone polyether fuel cell **proton conducting** membrane
- IT Polyketones
Polysulfones, uses (polyether-, arom., sulfonated, **phosphonic acid-contg.**; **proton-conducting** sulfonated polysulfone-polyethers and polyketone-polyethers as fuel cell separators)
- IT Polysulfones, uses (polyether-polyoxyphenylene-, arom., block, sulfonated, **phosphonic acid-contg.**; **proton-conducting** sulfonated polysulfone-polyethers and polyketone-polyethers as fuel cell separators)
- IT Polyoxyphenylenes (polyether-polysulfone-, arom., block, sulfonated, **phosphonic acid-contg.**; **proton-conducting** sulfonated polysulfone-polyethers and polyketone-polyethers as fuel

- cell separators)
- IT Polyethers, uses
(polyketone-, arom., sulfonated, **phosphonic acid-contg.**; **proton-conducting sulfonated polysulfone-polyethers** and polyketone-polyethers as fuel cell separators)
- IT Polyethers, uses
(polyoxyphenylene-polysulfone-, arom., block, sulfonated, **phosphonic acid-contg.**; **proton-conducting sulfonated polysulfone-polyethers** and polyketone-polyethers as fuel cell separators)
- IT Polyethers, uses
(polysulfone-, arom., sulfonated, **phosphonic acid-contg.**; **proton-conducting sulfonated polysulfone-polyethers** and polyketone-polyethers as fuel cell separators)
- IT Fluoropolymers, uses
(porous substrates; **proton-conducting sulfonated polysulfone-polyethers** and polyketone-polyethers as fuel cell separators)
- IT Fuel cell separators
(**proton-conducting sulfonated polysulfone-polyethers** and polyketone-polyethers as fuel cell separators)
- IT Ionic conductivity
(**proton; proton-conducting sulfonated polysulfone-polyethers** and polyketone-polyethers as fuel cell separators)
- IT 122-52-1DP, Triethyl phosphite, reaction products with sulfonated brominated **polysulfone-polyethers** 25839-81-ODP, Poly(oxy[1,1'-biphenyl]-4,4'-diyloxy-1,4-phenylenesulfonyl-1,4-phenylene), sulfonated, brominated, reaction products with tri-Et phosphite 83094-08-ODP, sulfonated 83094-08-ODP, sulfonated, brominated, reaction products with tri-Et phosphite
(membranes; **proton-conducting sulfonated polysulfone-polyethers** and polyketone-polyethers as fuel cell separators)
- IT 13598-36-2DP, **Phosphonic acid**, aryl and polymeric derivs. 174899-22-ODP, sulfonated
(membranes; **proton-conducting sulfonated polysulfone-polyethers** and polyketone-polyethers as fuel cell separators)

L56 ANSWER 7 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN

2003:352062 Document No. 138:354944 **Proton-conductive** membrane for electrochemical applications.
Jakoby, Kai; Nunes, Suzana Pereira; Peinemann, Klaus-Victor
(GKSS-Forschungszentrum Geesthacht G.m.b.H., Germany). Ger. Offen.

DE 10148131 A1 20030508, 4 pp. (German). CODEN: GWXXBX.
APPLICATION: DE 2001-10148131 20010928.

- AB A **proton-conductive** membranes for electrochem. applications, in particular for **fuel cells**, are manufd. by attaching **phosphonic acid** groups to arom. rings of nonvinyl polymers such as polysulfones without spacer groups between the rings and the **phosphonic acid** groups. Optionally, the polymers also have sulfonic acid groups directly bonded to the arom. rings.
- IC ICM C08J005-22
ICS C08G075-20; B01D071-82; H01M008-02
- CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52
- ST polysulfone **phosphonated proton conductive** membrane **fuel cell**; sulfonated **phosphonated** polymer **proton conductive** membrane **fuel cell**
- IT Polysulfones, uses
(**phosphonic acid** derivs.; **proton-conductive** membranes based on **phosphonic acid** derivs. of polysulfones for electrochem. applications)
- IT Polysulfones, uses
(polyether-, **phosphonic acid** derivs.; **proton-conductive** membranes based on **phosphonic acid** derivs. of polysulfones for electrochem. applications)
- IT Polyethers, uses
(polysulfone-, **phosphonic acid** derivs.; **proton-conductive** membranes based on **phosphonic acid** derivs. of polysulfones for electrochem. applications)
- IT **Fuel cells**
Ionic conductors
Membranes, nonbiological
(**proton-conductive** membranes based on **phosphonic acid** derivs. of polysulfones for electrochem. applications)
- IT 25839-81-ODP, **phosphonic acid** derivs.
(**proton-conductive** membranes based on **phosphonic acid** derivs. of polysulfones for electrochem. applications)

L56 ANSWER 9 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN
2002:693172 Document No. 137:201741 Aromatic polyether containing **phosphonate** groups and a process for the manufacture thereof. Sasaki, Shigeru; Yashiro, Arihiro; Hidaka, Yasuaki (Sumitomo Chemical Company, Limited, Japan). EUR. Pat. Appl. EP 1238998 A1 20020911, 15 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR. (English). CODEN: EPXDXW. APPLICATION: EP 2002-3124 20020213. PRIORITY: JP 2001-38116 20010215; JP 2001-125501 20010424; JP 2001-379819 20011213.

Applicants

- AB Provided is an arom. polymer **phosphonic** acid deriv. in which a **phosphonic** acid deriv. group is directly bound to an arom. ring. The arom. polymer **phosphonic** acid deriv. can be produced by brominating a specific arom. polymer compd. with a brominating agent, then acting thereon trialkyl phosphite in the presence of a nickel halide catalyst to give a **phosphonic** acid di-ester, and further, by hydrolyzing the di-ester. The arom. polymer **phosphonic** acid deriv. is excellent in radical resistance and used for a solid polymer type **fuel** cell. A polymer with repeating unit p-C₆H₄SO₂-p-C₆H₄O-p-C₆H₄-pC₆H₄O was brominated with N-bromosuccinimide, then treated with tri-Et phosphate.
- IT 122-52-1DP, Triethyl phosphite, reaction products with brominated polyether-polysulfones
(arom. polyether contg. **phosphonate** groups and a process for the manuf. thereof)
- RN 122-52-1 HCAPLUS
- CN Phosphorous acid, triethyl ester (8CI, 9CI) (CA INDEX NAME)

OEt

EtO-P-OEt

- IC ICM C08G075-23
ICS C08G065-48; B01D071-52; B01D071-68
- CC 35-5 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 52
- ST arom polyether **phosphonate** group electrolyte membrane
- IT Bromination
Polymer electrolytes
(arom. polyether contg. **phosphonate** groups and a process for the manuf. thereof)
- IT Polyoxyarylenes
(**phosphonate** group-contg.; arom. polyether contg. **phosphonate** groups and a process for the manuf. thereof)
- IT Polysulfones, preparation
(polyether-, **phosphonate** group-contg.; arom. polyether contg. **phosphonate** groups and a process for the manuf. thereof)
- IT Membranes, nonbiological
(polymer electrolyte; arom. polyether contg. **phosphonate** groups and a process for the manuf. thereof)
- IT Polyethers, preparation
(polysulfone-, **phosphonate** group-contg.; arom. polyether contg. **phosphonate** groups and a process for the manuf. thereof)
- IT 7718-54-9, Nickel (II) chloride, uses
(arom. polyether contg. **phosphonate** groups and a process for the manuf. thereof)
- IT 122-52-1DP, Triethyl phosphite, reaction products with

brominated polyether-polysulfones

25839-81-ODP, brominated, reaction products with tri-Et phosphite
83094-08-ODP, 4,4'-Biphenol-4,4'-dichlorodiphenyl
sulfone-4,4'-dihydroxydiphenyl sulfone copolymer, brominated
(arom. polyether contg. phosphonate groups
and a process for the manuf. thereof)

L56 ANSWER 10 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN

2001:670069 Document No. 135:372092 Synthesis and **proton**
conductivities of phosphonic acid containing
poly-(arylene ether)s. Meng, Y. Z.; Tjong, S. C.; Hay, A. S.; Wang,
S. J. (Guangzhou Institute of Chemistry, Chinese Academy of
Sciences, Canton, 510650, Peop. Rep. China). Journal of Polymer
Science, Part A: Polymer Chemistry, 39(19), 3218-3226 (English)
2001. CODEN: JPACEC. ISSN: 0887-624X. Publisher: John Wiley &
Sons, Inc..

AB A novel **phosphonic acid** contg. bisphenol was successfully
synthesized from phenolphthalein and m-aminophenylphosphonic
acid. A series of homo- and copoly(arylene ether)s contg.
phosphonic acid groups were prepd. by soln. nucleophilic
polycondensation. These **phosphonic acid**-contg. polymers
can readily be dissolved in common org. solvents, such as DMSO,
N-methyl-2-pyrrolidinone, and N-cyclohexylpyrrolidinone, and can be
cast into tough and smooth films. The presence of
phosphonic acid pendants in the poly(arylene ether)s was
confirmed by NMR, matrix-assisted laser desorption/ionization
time-of-flight mass spectrometry, and cond. measurements. These
poly(arylene ether)s had very high glass transition temps. ranging
from 254.degree. to >315.degree. and high mol. wts. The
conductivities of the synthesized polymers were analyzed by the
Cole-Cole method, and they ranged from 10⁻⁵ to 10⁻⁶ S cm⁻¹. The
synthesized polymers also exhibited good soln. processability.

CC 35-5 (Chemistry of Synthetic High Polymers)

ST polyether arom **phosphonic acid** contg; polyarylene ether
phosphonic acid contg; ionic cond **phosphonic acid**
contg polyether

IT Polymerization
(of **phosphonic acid**-contg. bisphenol with
bis(fluorophenyl) sulfone)

IT Absorption
(of water; by **phosphonic acid**-contg. arom. polyethers)

IT Polysulfones, preparation
(polyether-, **phosphonic acid** group-contg.;
synthesis and proton conductivities of
phosphonic acid-contg. arom. polyethers)

IT Polyethers, preparation
(polysulfone-, **phosphonic acid** group-contg.;
synthesis and proton conductivities of
phosphonic acid-contg. arom. polyethers)

IT Ionic conductivity
(proton; synthesis and proton
conductivities of **phosphonic acid**-contg. arom.

- polyethers)
- IT 7732-18-5, Water, processes
(absorption; of **phosphonic acid-contg. arom.**
polyethers)
- IT 81-90-3P, Phenolphthalin 142717-68-8P 294212-76-3P
(intermediate; in synthesis of **phosphonic acid-contg.**
bisphenol for prepn. of arom. polyethers)
- IT 374594-34-0
(monomer; for prepn. of **phosphonic acid-contg. arom.**
polyethers)
- IT 77-09-8, Phenolphthalein
(reactant; in synthesis of **phosphonic acid-contg.**
bisphenol for prepn. of arom. polyethers)
- IT 5427-30-5P, 3-Aminophenylphosphonic acid
(reactant; in synthesis of **phosphonic acid-contg.**
bisphenol for prepn. of arom. polyethers)
- IT 374594-35-1P, Bisphenol A-bis(4-fluorophenyl) sulfone-[3-[4,9-bis(4-hydroxyphenyl)-1,3-dioxo-1,3-dihydrobenzo[f]isoindol-2-yl]phenyl]
phosphonic acid copolymer 374594-36-2P 374594-37-3P
(synthesis and **proton conductivities of**
phosphonic acid-contg. arom. polyethers)

L56 ANSWER 12 OF 13 HCAPLUS COPYRIGHT 2003 ACS on STN

- 2000:260778 Document No. 132:294808 Composite solid polymer electrolyte membranes. Formato, Richard M.; Kovar, Robert F.; Osenar, Paul; Landrau, Nelson; Rubin, Leslie S. (Foster-Miller, Inc., USA). PCT Int. Appl. WO 2000022684 A2 20000420, 95 pp. DESIGNATED STATES: W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 1999-US19476 19990826. PRIORITY: WO 1998-US17898 19980828; US 1999-261349 19990303.
- AB The present invention relates to composite solid polymer electrolyte membranes (SPEMs) which include a porous polymer substrate (typically a liq. crystal polymer) interpenetrated with an ion-conducting material (typically a perfluorinated ionomer). SPEMs of the present invention are useful in electrochem. applications, including **fuel cells** and electrodialysis.
- IC ICM H01M
- CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52
- ST composite solid polymer electrolyte membrane; **fuel cell** polymer electrolyte membrane; electrodialysis polymer electrolyte membrane; liq crystal polymer interpenetrating network electrolyte; perfluorinated ionomer interpenetrating network electrolyte
- IT **Fuel cells**
(direct methanol or hydrogen; composite solid polymer electrolyte

membranes)
IT Polyimides, uses
Polyimides, uses
Polyketones
Polyketones
Polysulfones, uses
Polysulfones, uses
(polyether-; composite solid polymer electrolyte
membranes)
IT Polyethers, uses
Polyethers, uses
(polysulfone-; composite solid polymer electrolyte
membranes)
IT 9003-01-4, Polyacrylic acid 24938-64-5 24938-67-8,
Poly[oxy(2,6-dimethyl-1,4-phenylene)] 24938-68-9,
2,6-Diphenylphenol homopolymer, sru 25035-37-4,
p-Phenylenediamine-terephthalic acid copolymer 25134-01-4,
2,6-Dimethylphenol homopolymer 26101-52-0, Polyvinyl sulfonic acid
26353-84-4, 2,6-Diphenylphenol homopolymer 27754-99-0, Polyvinyl
phosphonic acid 50851-57-5, Polystyrene sulfonic acid
264624-35-3, Trifluorostyrenesulfonic acid homopolymer
(composite solid polymer electrolyte membranes)